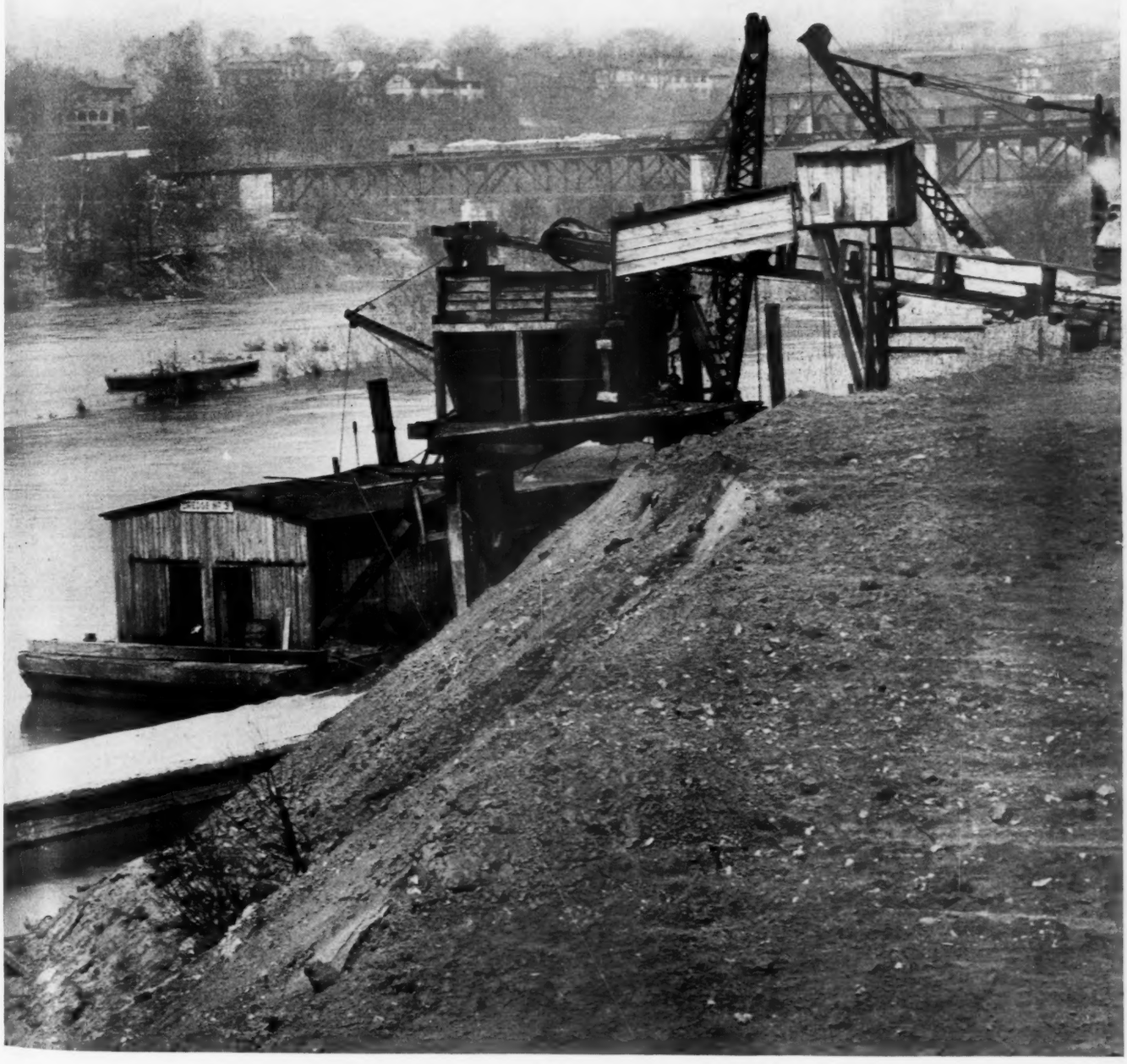
Volume XXX Chicago, November 12, 1927 No. 23

Rock Products

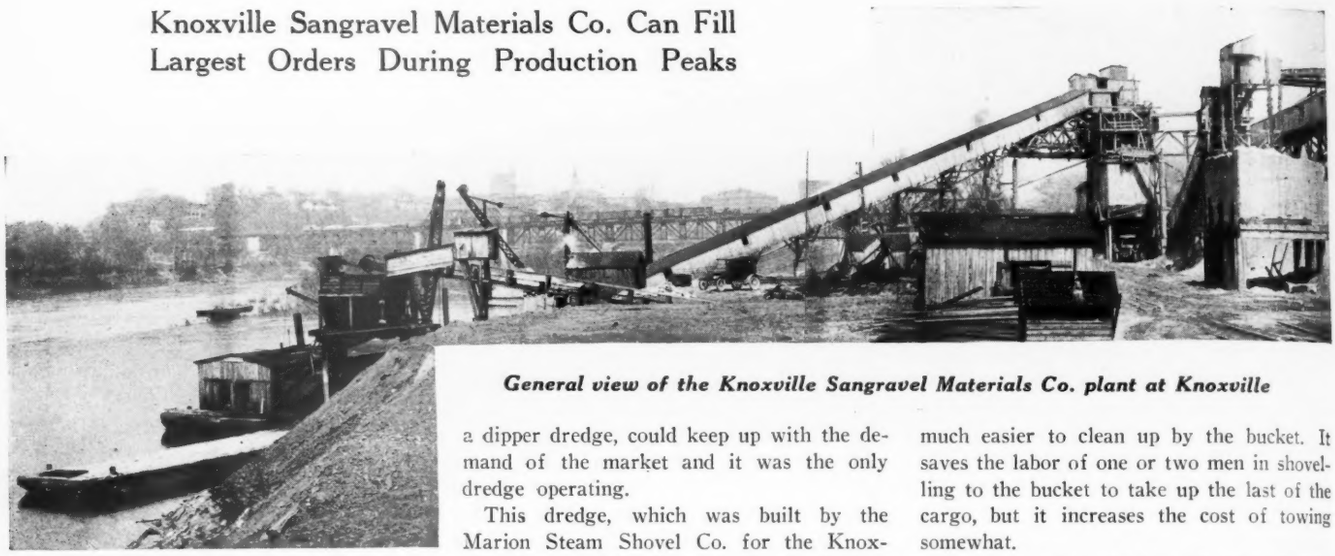
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896



Part of the river equipment of the Knoxville Sangravel Materials Co., at Knoxville, Tenn.

Efficient Gravel Storage and Handling System

Knoxville Sangravel Materials Co. Can Fill Largest Orders During Production Peaks



General view of the Knoxville Sangravel Materials Co. plant at Knoxville

THE Knoxville Sangravel Materials Co. is among the largest producers on the upper Tennessee river, and its plant at Knoxville, Tenn., is exceptionally well constructed and equipped. It has always specialized on handling large contracts and a comparatively recent addition to the plant is a storage system which will permit it to fill the largest orders, even when the plant is at peak production. As the owners have been in the contracting business in a large way they appreciate the necessity of prompt delivery in heavy tonnage orders.

As with all the other producers in this district, the material comes from the bed of the Tennessee. The company had two dredges in service, and was building a third when the plant was visited. At this time, which was early in the season, one of these, a dipper dredge, could keep up with the demand of the market and it was the only dredge operating.

This dredge, which was built by the Marion Steam Shovel Co. for the Knoxville Sangravel Co., is much like the dredges which have been used by the United States government for dredging the channel of the river, and it is admitted to be the best type for the hard digging encountered there. It has a 1-yd. bucket and a 50-ft. boom, and it can dig 1000 yd. daily, provided it is supplied with barges for continuous operation.

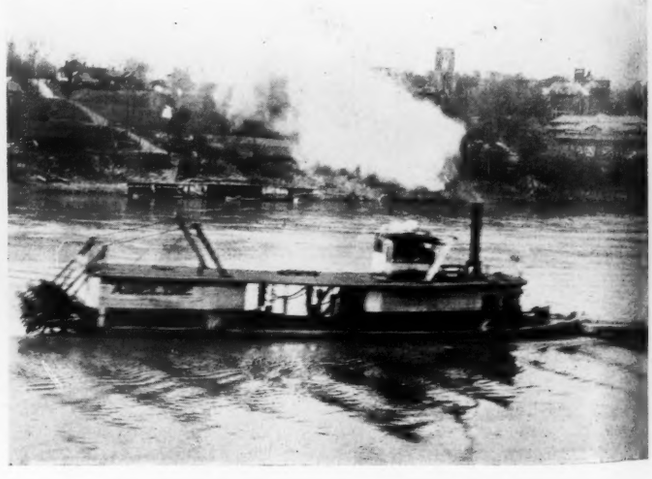
The bucket dredge referred to was built at the plant. It has a Clyde hoist and derrick, all steel, with a 50 ft. boom, and it can handle a 1½ yd. bucket. At the time the plant was visited this dredge was being held at the wharf to help unload the barges.

The barges are of the flush deck type without cargo box, a form universally used on this part of the river. By omitting the cargo box (the load being simply piled on the deck by the dredge) the barge is made much easier to clean up by the bucket. It saves the labor of one or two men in shovelling to the bucket to take up the last of the cargo, but it increases the cost of towing somewhat.

Barges are brought into the plant by the steamer *Adeline*, a full sized stern wheel steamboat such as has been used on the rivers of the South for two or three generations. The dredge was operating about four miles from the plant when it was visited, and down the river, so that the tow boat with loaded barges had to be made against the current. But the boat made it in about an hour, which seems exceptionally good time for such conditions.

On reaching the landing the barges are unloaded by a derrick with clamshell bucket, assisted by the derrick boat, or bucket dredge, when this is employed at the wharf. The wharf derrick is of Clyde make and has a 70 ft. steel boom. It is driven by a Flory three-drum hoist and has a Clyde swing engine. Both Blaw-Knox and "Bulldog" buckets are used, the capacity being

Dipper dredge of the Knoxville Sangravel Materials Co.



Steamer towing barges to washing plant

The Knoxville Sangravel Materials Co. plant as seen from the river

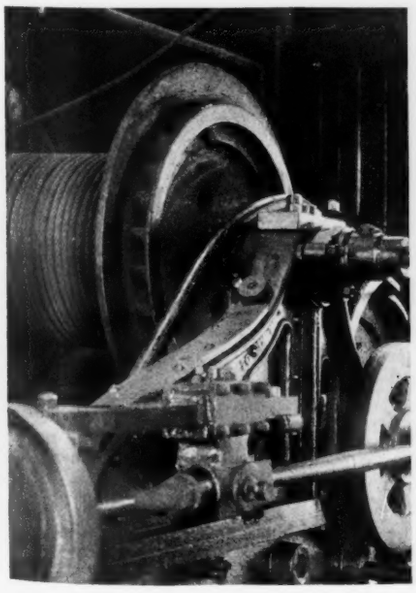
1 yd. or 1½ yd. The hoist is steam driven as steam is considered more economical for such intermittent work. But all the plant machinery is electrically driven, both Westinghouse and General Electric motors being used.

The unloading buckets discharge to a hopper and the material falls on to a 20 ft. travelling grizzly, a novel device in gravel plants. This is an endless chain of rollers which are 6-in. in diameter and set on 10-in. centers. Two rollers form a link (with the side pieces to which they are attached) and the links are connected to form a chain which passes over heavy sprockets at the ends. The rollers are free to turn and roll by friction as the chain moves. This rolling motion helps to carry the material through.

The material has to pass through both the upper and under side of the chain of rollers and the man in charge was asked if the device gave trouble from having stones pass through the upper rollers and refuse to pass through the lower. He said that this had happened at long intervals but it had given no trouble. Striking the refractory stone with a bar was sufficient to discharge it.

The oversize of this traveling grizzly, which is everything that will not pass the 4-in. spaces between the rollers, goes to the largest crusher that has been noted in a plant handling river gravel. It is a jaw crusher with a 24 x 36-in. opening and it was made by the F. K. Morris Co. It is driven by a 100 hp. motor.

The discharge of the crusher goes to an elevator which has 24-in. wide buckets, close connected, and which is of 35 ft. centers. This feeds to the main conveyor belt which also takes the undersize of the traveling grizzly then the screening and washing plant.



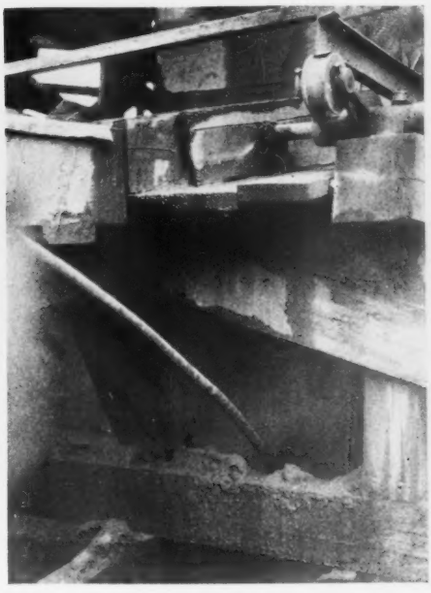
Hoist on wharf derrick

Traveling grizzly made of 6-in. rollers and links

This belt is 300 ft. centers and 26 in. wide. It runs in a covered gallery and is supported on a steel trestle. It discharges at the top to a scalping screen which is of the Stephens-Adamson Gilbert type 84-in. at the barge end and 46-in. at the small end. There are two jackets. The inner has 2-in. perforations and the 1½-in. perforations.

The oversize from this screen goes to an Weston No. 2 crusher and then to a short elevator which lifts it to the same screen. The intermediate size (between 1½-in. and 2 in.) goes to a bin. The product through 1½ in. is split between two sizing screens. These are also Gilbert screens (of the same size as the scalping screen) and they have two jackets each. The inner jackets have 1¼-inch holes and the outer ⅜-in. holes. All products go to bins except the through product of the ⅜-in. holes which goes to the sand settlers.

The first sand settler is a pyramidal tank with an automatic dumping device. The tank is carried between two channel irons, the front ends of which rest on rollers. These rollers are fastened to an arm on a shaft, and the shaft has another arm on which a counterweight is hung. This weight rises when sand has accumulated in the tank to cause it to tip forward, allowing the valve at the bottom to open. It is said to be unusually good about closing quickly to prevent an excess of water from escaping with the sand.



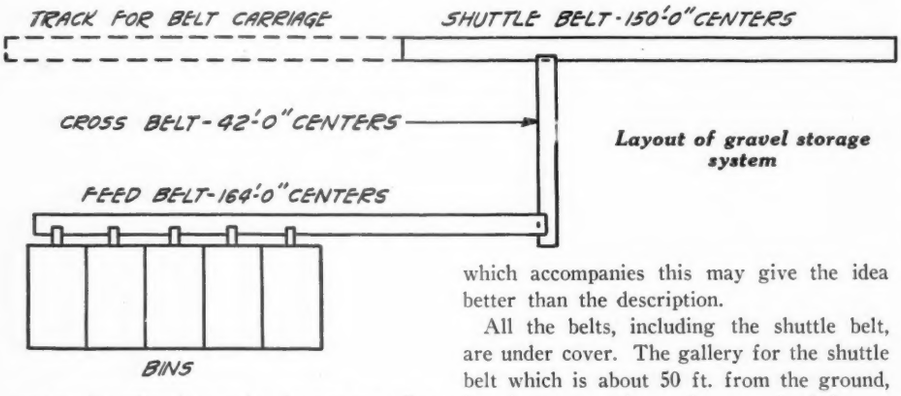
Sand tank showing tilting mechanism

Below this tank are four wooden boxes each 5 ft. by 5 ft. through which the overflow from the automatic tank flows. The sand which settles out in these is fine sand used for plastering and brick work. The sand from the automatic tank is concrete sand of excellent quality rather coarser than river sand usually is.

The bins are reinforced concrete and will hold 800 yds. There are four partitions making five bins and some of these are fitted with batchers built at the plant so they may be used to load trucks with batched material. Railroad cars are loaded from these bins the tracks passing under ordinary gates in the bottom.

The storage system which is one of the features of this plant uses belts for the handling of the material both in and out of storage. The feed belt, which is 164 ft. between centers runs beside the bins, under spouts, so that it may take feed from any bin. This belt is inclined after it leaves the bin and it delivers to a cross belt of 42 ft.

Storage system showing the conveyor galleries housing the belts handling gravel both in and out of storage



Layout of gravel storage system

centers, introduced to make the storage piles a sufficient distance from the bins. This cross belt feeds on a horizontal shuttle belt 150 ft. between centers which is carried on a frame set on rollers. It can be pushed back and forth on a track 300 ft. long and it is reversible so that the discharge may be from either end. In this way the discharge may be dropped on any point below. This arrangement cost somewhat less to install than a 300 ft. belt with tripper and the wear on the belt is said to be less. A sketch which accompanies this may give the idea better than the description.

All the belts, including the shuttle belt, are under cover. The gallery for the shuttle belt which is about 50 ft. from the ground, is, of course, twice as long as the belt.

To recover the material from the piles there is a belt in a concrete lined tunnel which is 7x7 ft. in the clear. There are 30 openings in the roof of this tunnel each with a segmental type gate and a chute to feed on the belt. The belt is of 300 ft. centers and it delivers into the boot of an elevator which raises the material 85 ft. This elevator is of the bucket and belt type with close connected buckets and it is set about 15 deg. from the vertical. It discharges into a small hopper at the top from which three spouts lead. One of these goes to the bins, so that the material may be loaded directly into railroad cars. Another goes to the No. 2 crusher so that the 2-in. size may be recreased to make all 1½-in. and finer. The third spout goes to a concrete bin on the street car track. The street car company uses a great deal of material from this plant in its construction work and loads open-top cars from below this bin.

The conveyors for this storage system and all the other conveyors and the screening and washing equipment were furnished by the Stephens-Adamson Co.

Only gravel is handled in the storage system just described. Sand is spouted out on the ground between the plant and the river and loaded, if for truck delivery, by a Barbour-Greene loader. It is loaded by an Erie crane electrically driven, for railroad deliveries and for batching.

A considerable part of the output is sold as batched material. A Blaw-Knox batcher

Elevator at end of reclaiming belt and street car bins

Loading the sand batcher

is used for sand and the batcher under the bins for gravel.

The bed of the Tennessee at this part of the river is largely gravel and it is estimated that 75% of the material dug is either gravel or cobbles so large that they must be crushed. To supply the extra sand needed the company purchases the entire output of the Miller Sand Co. which operates a ladder dredge on sand bars in the river. The Knoxville Sangravel Co. was building another dredge at the time the plant was visited, to dig only sand. This is a bucket dredge and the bucket delivers into a hopper from which conveyors lead to the side to fill barges.

The office of the company is at the plant which is on the Marysville Pike about a mile from the city. R. F. Farrell is manager of the plant. The officers are: George J. Oehler, president, W. J. Lang, vice president and Henry Nerwin, secretary.

A Story Without Words

THE illustration to the right is the first of a series of advertisements published by the Southern California Rock Products Association, of which E. Earl Glass is general manager. There is little comment necessary, except to say that the prices of sand, gravel and crushed stone in Los Angeles are about the lowest of similar prices anywhere; *yet* the live-wire producers of this live-wire community are able to find the wherewithal for a real advertising campaign. Need any more be said?

Mineral Production of Florida Shows Increase in 1926

THE following figures supplement the information published in ROCK PRODUCTS of October 15 on production and valuation of crushed limestone in Florida in 1926:

The value of all mineral productions in Florida during 1926 was $20,724,487, or over $3,000,000 more than in 1925, according to figures announced State Geologist Herman Gunter.

The statistics were collected by the State Department in co-operation with the United States Bureau of Mines and United States Census Bureau, and through the courtesy of the individual Florida producers. The value of the output for 1925 was $17,522,302.

The greatest increase was in the production of lime and limestone, gains nearly doubling both quantity and value. A loss was shown in the quantity of land pebble phosphate produced, but a substantial increase was shown in value.

Increase in Sand

Increases were noted in both quantity and value of sand and gravel, Fuller's earth and kaolin.

Decreases in both quantity and value were found in the output of hard rock phosphate, crushed flint and sand lime brick.

Following were the figures given by Mr. Gunter for the two years:

For 1925, long tons:

Land pebble phosphate, quantity, 2,758,315 tons, valued at $8,081,137, and hard rock phosphate, 171,649 tons, $707,933.

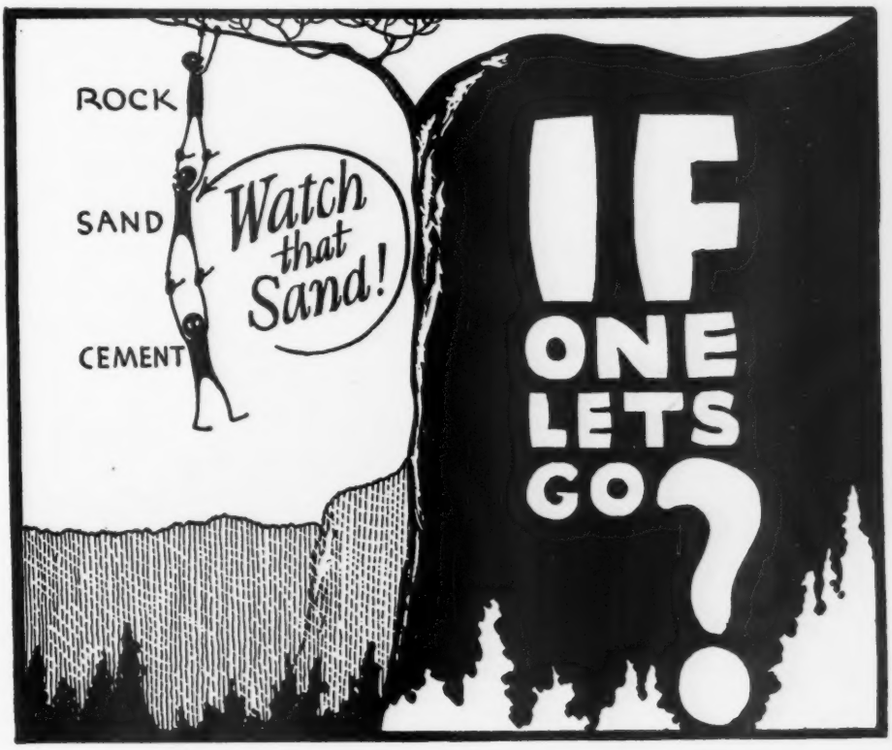
Lime and Limestone Production Important

Short tons, lime and limestone, 3,813,213 tons, $4,534,884; crushed flint, 231,370 tons, $338,873; sand and gravel, 1,515,529 tons, $1,089,215; Fuller's earth and kaolin, 118,985 tons, $1,743,921; common building brick, 21,981,000, valued at $243,759; clay products, including face brick, roofing tile, floor tile, red earthware and pottery, $83,630, quantity not given; sand lime brick, 26,993,000, valued at $323,385.

For 1926, long tons:

Land pebble phosphate, 2,591,943 tons, $8,218,200; hard rock phosphate, 116,264 tons, $465,308.

Short tons, lime and limestone, 6,582,294 tons, $7,277,806; crushed flint, 212,560 tons, $233,941; sand and gravel, 1,841,009 tons, $1,483,757; Fuller's earth and kaolin, 126,301 tons, $1,886,909; common building brick, 39,697,000, valued at $395,115; clay products, including face brick, roofing tile, floor tile, red earthenware and pottery, $70,845, quantity not given; sand lime brick, 19,743,000, valued at $223,896.



YOUR CONCRETE must have "team-work." Though you use the strongest cement, it cannot hold together dirty sand or crumbling rock. These materials must be strong or the job is a total loss.

—No extra cost to get results.

—Insist on Washed Sand!

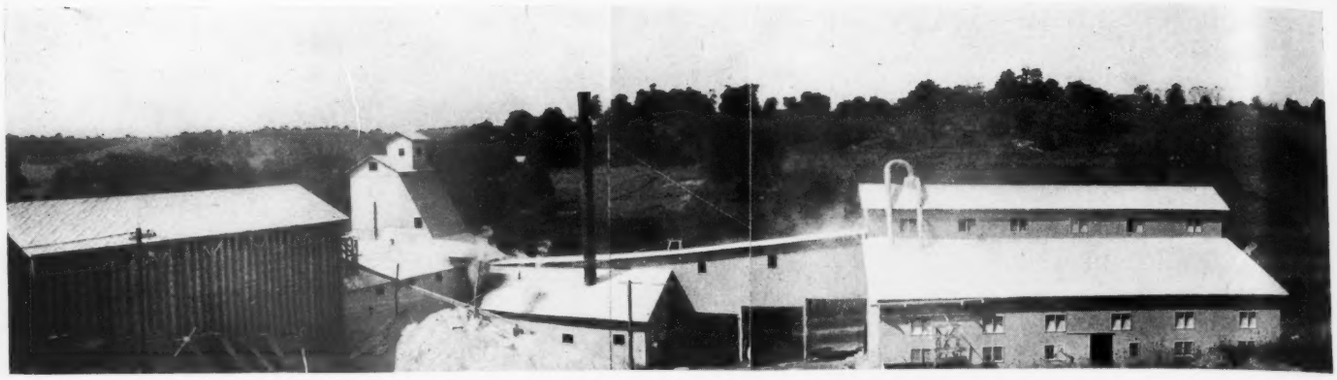
Watch that Sand!

SOUTHERN CALIFORNIA ROCK PRODUCTS ASSOCIATION BUILD *for* PERMANENCE

SOUTHERN CALIFORNIA ROCK PRODUCTS ASSOCIATION

800 Hibernian Building—Los Angeles

Sample of a new sand and gravel advertising campaign



General view of the Central Silica Co.'s plant at Glass Rock, Ohio. The washing plant and drainage bins are at the left; dry screening plant, left center, and pulverizing plant at the right

Central Silica Company's Modern Plant at Glass Rock, Ohio

Recently Completed Plant Designed to Produce Several Grades of Silica Sand and Pulverized Silica

A FEW years ago, control of the Central Silica Co. was acquired by the Ayers Mineral Co., Zanesville, Ohio. Plans were formulated for a new and modern silica sand plant and a new quarry opened. In May, 1927, the work was completed and the plant formally opened on September 23. Operations at the old quarry, however, were not entirely discontinued while the change was being made, the production of wet and dry steel molding sand being carried out on a part-capacity basis.

Changes were made in all departments. The old system of washing and classifying the sand by means of a sluice box and settling tank was replaced by modern screw washers and vibrating screens. A new sand dryer of large capacity was installed, storage bins for wet and dry materials put up and a modern type of conical mill substituted for the old tube mill used to pulverize the silica. Several of the plant structures were also rebuilt.

The deposit at Glass Rock has an interesting geological history. It lies in the unglaciated plateau almost on the line where the glaciated area begins. This section, in the northern part of Perry county is a part of the Sharon conglomerate, the basal member of the Pottsville formation. At Glass Rock the Sharon is a sandstone which lies on top of the Maxville limestone, the top of the Mississippian formation, outcropping in a region almost entirely of Pennsylvanian origin. Part of the same outcrop is worked at Fultonham by the Pittsburgh Plate Glass Co. for part of its cement raw materials, the additional limestone occurring very close by.

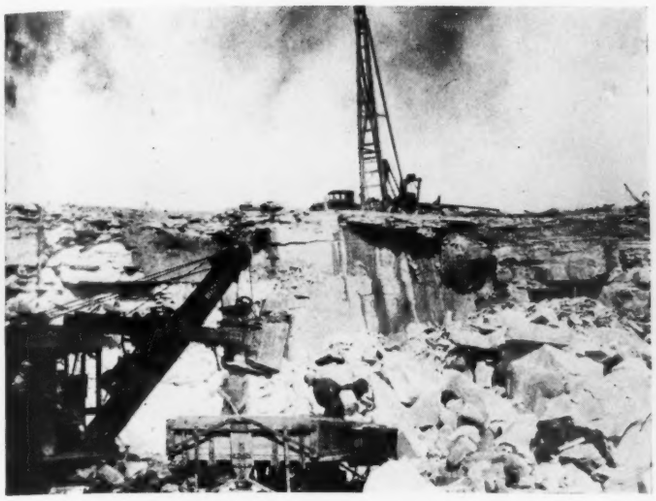
Deposit

Twenty-six acres of thoroughly prospected ground, estimated to contain about 3,500,000 tons of recoverable material, make up the holdings at Glass Rock. The ground is level to rolling, the sandstone quarries being opened on hillsides on the east and west lines. The No. 1 quarry on the east was the first opened and a circular face about 500 ft. long developed. The No. 2 quarry has also been opened to some extent and here a circular face about 40 ft. high is being worked. From 5 to 8 ft. of overburden, consisting mostly of a stratum of shale and clayey top soil, overlies the 35-ft. bed of sandstone at this quarry.

The top soil of both quarries is removed by a Bucyrus steam shovel and loaded into 5-yd. Western and 2-yd. Koppel cars and hauled by a 5-ton Hadfield-Penfield "American" gasoline locomotive to the dump. Holes are then put down the depth of the face by a Sanderson Cyclone well drill. The holes are spaced from 12 to 15 ft. with 12-ft. burden and shot with 40% Trojan powder and Cordeau Bickford fuse. The rock, a friable sandstone, breaks easily and in large pieces which are broken down further on the quarry floor to crusher size by sledging and pop-shooting to break the rock. An

Section of the quarry face at No. 2 quarry, 40 ft. of high grade silica rock

After a blast—The workers are sledging the rock in the cars to crusher size



Shovel loading at the No. 2 quarry

Hand selecting rock on the quarry floor

Ingersoll-Rand Jackhamer drill with 7/8-in. bit is used to prepare the rock for pop-shooting.

A Bucyrus Model 31B steam shovel mounted on caterpillar treads and equipped with a 1-yd. dipper works on the quarry floor, loading the broken rock to the quarry cars. A No. 9 Plymouth gasoline locomotive hauls the loaded cars, two at a time, to a wooden storage bunker holding about 150 tons. The cars run on a narrow gage track, ending on a trestle over the bunker and crusher.

Crushing

The cars are dumped by hand to storage, from which the rock is fed by hand-operated gate to the crusher, a Kennedy No. 5, which reduces the rock to 2 in. and under. The crusher is driven by a 35-hp., 220-v., a.c. General Electric motor generator.

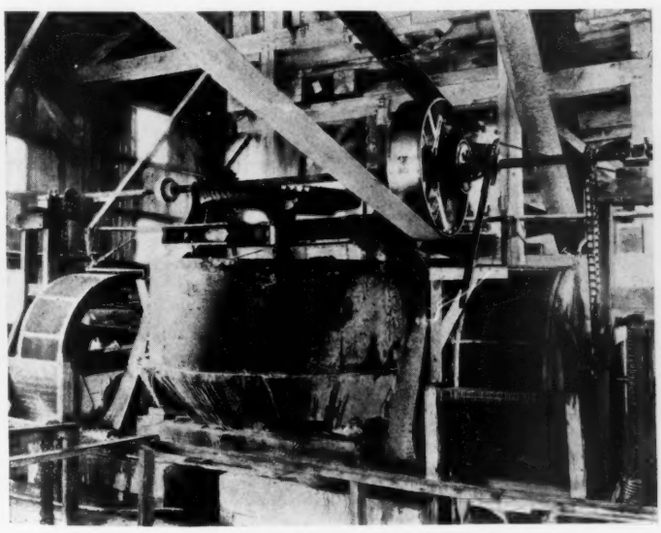
The discharge of the crusher is washed by a stream of water and passes to a 9-ft. Lewistown chaser mill or wet-grinding pan. This type of machine is generally used in the Pennsylvania-West Virginia glass sand plants, where a sandstone similar to this must be crushed to individual grains before further washing and cleaning. Briefly, the machine comprises a circular cast-iron pan 9 ft. in diameter and 2½ ft. deep. A horizontally driven shaft runs through the center and this operates two steel mullers or rollers, 60 in. in diameter and with a 12-in. face, which run in a manganese steel track. On each side of the mill the pan casting is cut away and the opening replaced with a perforated steel plate. The motion of the mullers or rollers throws water and sand against the screen and the fine material passes through by gravity to two short, cylindrical screens mounted on each side of the mill and driven by a countershaft from the main shaft. These screens are 6 ft. in diameter and 30 in. long and have radial lifters around the inside to return the oversize to near the top, where it is discharged into a launder and returned to the wet pan. The wet pan and screens are belt driven from the power plant. Brass wire cloth of 10-mesh size is used on the short screens. The capacity of the mill is about 30 tons per hour with the rollers running at 27 r.p.m.

Washing

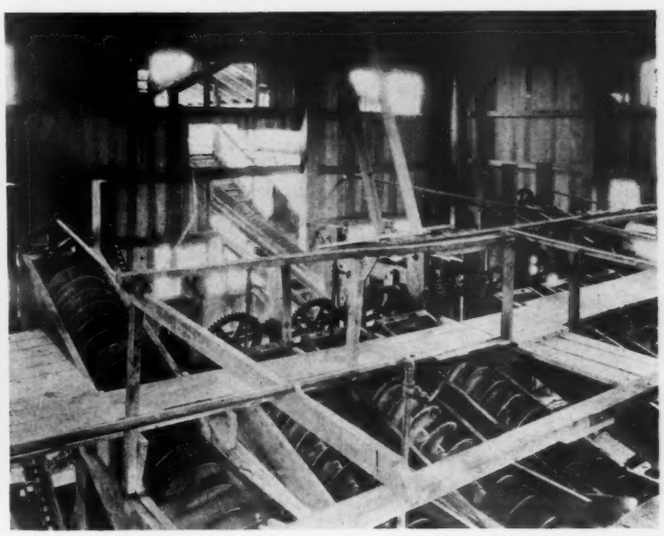
The sand, 10-mesh and under, along with the washing water, is sent by flume to two sets of four-screw washers. These were furnished by the Lewistown Foundry and Machine Co. and are of the usual type found in silica sand plants. The washers are belt driven by shaft and pulley from the main pulley in the power house. The worms on the washers rotate at about 8 r.p.m. and the total washing capacity is from 25 to 30 tons per hour.

The foregoing procedure is the same with No. 1 sand (sand which contains from 99% to 100% silica) and No. 2 sand (98% to 99% silica). The first selection of material is made at the quarry and the entire washing plant put on to run the particular grade. The principal differences in treatment occur in the practice which follows:

When No. 1 sand is worked, the washed sand from the screw washers is passed to a sluice feeding a 24-in. by 75-ft. belt conveyor which runs over the top of the drainage bins and is discharged to the bins along their length by trippers placed along the

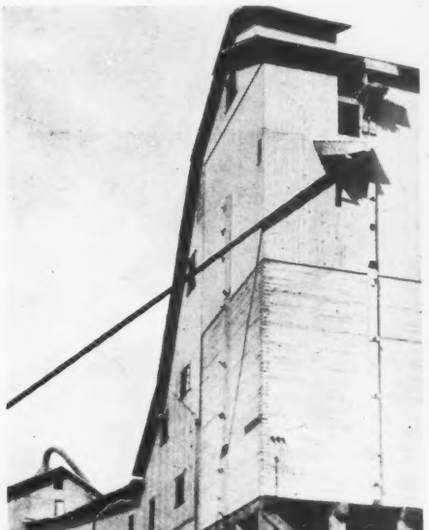


Chaser mill or wet-grinding pan



One of the two sets of screw washers

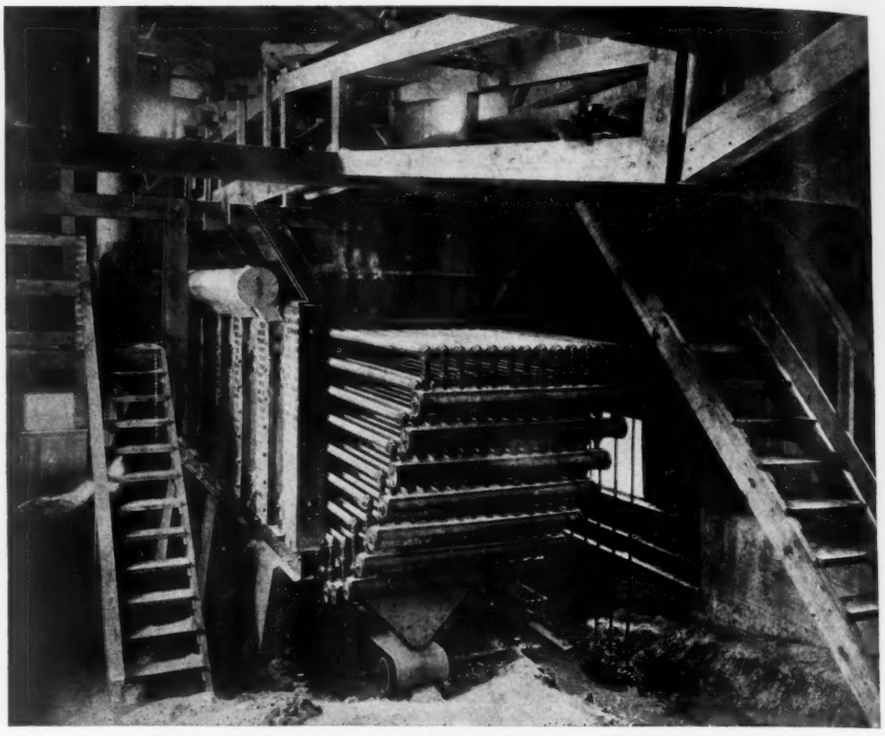
belt. The bins are of wood on concrete foundation and were built at the plant by the company after the design furnished by the Lewistown Foundry and Machine Co. They hold about 3000 tons when full. The drained sand is discharged through a gate on the bottom of the bins to a belt conveyor running underneath and is passed to the



Dry screening plant and storage bins

dryer or to outside storage. In the drained state it is sold as No. 1 core sand or glass sand, damp, containing about 3% moisture.

In working No. 2 sand, the conveyor from the sand washers discharges to a 36-in. by 8-ft. Universal vibrating screen covered with 14-mesh Toncap wire cloth. The screen is

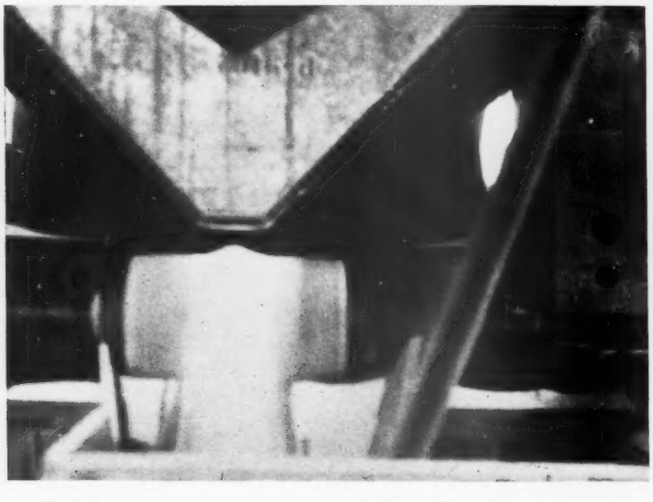


End view of dryer showing the construction details

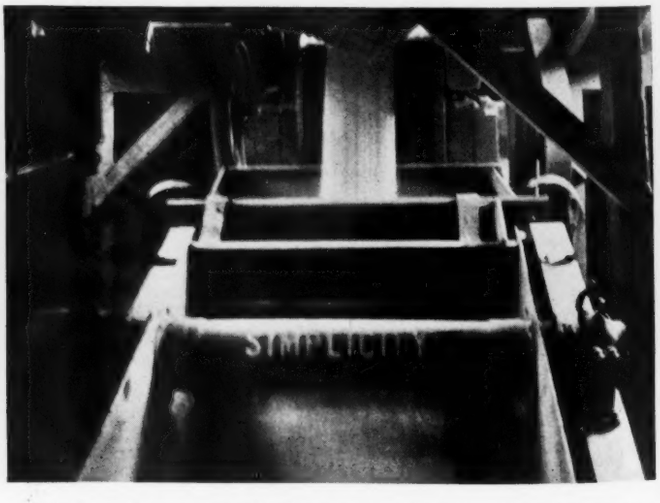
belt driven by a 1½-hp., 1700-r.p.m., 220-v. Century electric motor. The oversize passes to an outside storage pile and is sold for refractory sand, while the throughs are sent to outside storage as bottle-glass sand and core sand for open core work. About 15,000 tons of this latter material are kept on hand at all times.

Dried Sands

Two grades of dried silica sand are made, No. 1 dry for pulverizing and No. 2 dry for glass ware. The No. 1 dry is also the material which is sent to the pulverizing plant. The No. 1 damp is drawn from the drainage bins and passed to a 36-in. by 8-ft. Universal vibrating screen. The oversize of this screen is sluiced to outside storage, while the throughs drop on a conveyor belt feeding the Lewistown sand dryer. This dryer is a brick structure 18 ft. long by 72 in. wide, in which are 9 tiers of steam pipes. Each tier has independent steam inlet valves and exit valves for waste steam or condensed water, so that proper heat may be applied to any part of the dryer at will. The sand is dried indirectly, the wet material dropping through a hopper onto the top pipes of the dryer and then gradually working its way down through the succeeding tiers of pipes as it loses its moisture. The sand, since it has been thoroughly washed, does not cake on drying but trickles down in a steady stream to the bottom of the dryer, where it falls into a hopper feeding an endless belt conveyor. This conveyor discharges the sand to the boot of the belt and bucket elevator by which it is carried



Dried sand passing to boot of belt and bucket elevator, running to dry screening plant



Dried sand conveyor discharging on electric vibrating screen making two separations

Interior of pulverizing plant showing the conical grinding mill

Discharge end of the grinding mill and part of air classifier

to storage bins. The capacity of the dryer is about 15-tons of dried sand per hour.

A 100-hp. boiler, coal-fired, supplies steam for the dryer and a 25-hp. Nagle steam engine which operates the auxiliary equipment on the dryer. An automatic return system permits the same water to be used over and over again in the boiler, condensed steam in the pipes of the dryer being pumped immediately to the boiler. The exhaust steam from the engine passes to a cooling pond.

Directly over the dried sand storage bins is an electric vibrating screen through which the sand as it comes from the dryer is passed. The screen, of Universal make, is covered with 16-mesh Toncap wire cloth. The oversize is disposed of for different purposes, while the undersize goes to the bins as molding sand, etc., and is the source for the finer foundry sands, pottery sand and pulverized silica.

Pulverizing Plant

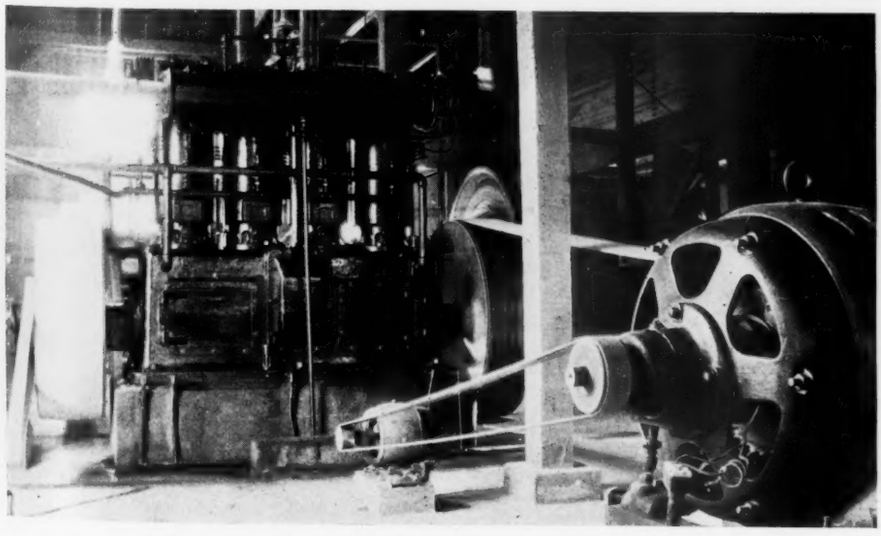
The pulverizing plant is an entirely new unit built especially for the purpose. It is a spacious building with the main equipment placed along all four sides, leaving the center practically clear to permit easy expansion of present facilities at any time. It is connected with the dry screening plant by a gallery in which runs a conveyor belt carrying dried sand (16-mesh and under). This belt discharges the sand to a hopper feeding a Simplicity electric vibrating screen running at 1800 vibrations per minute. The screen is belt driven from a 3-hp. Howell electric motor.

By fitting the screen with different sizes of cloth, several grades of sand are made. With 20-mesh cloth, the oversize (through 16-mesh and retained on the 20-mesh sieve) passes to storage as glass sand. The throughs are rescreened over a 30-mesh cloth and the oversize of this is by-passed to bins and stocked as pottery grade silica sand. The throughs are sent to the pulverizer. The mechanical separation incidentally provides sands of different iron contents. It has been shown that the coarser particles of sand contain the most iron; thus the finest screen material is a high silica product and is almost pure white in color, making it very desirable for pulverized silica for paints, ceramics and silica flour or "wash."

The pulverizer is the latest type of Hardinge conical mill, 8 ft. by 84 in., equipped with a 4½-ft. Superfine air classifier. It has a "Silex" lining and carries 9 tons of grinding pebbles. Briefly the operation of the mill is as follows: The sand (through 30-mesh) is fed at the rate of about 2 tons per hour to the mill by a rotary undershot feeder. The ground particles are picked up by the air current circulating in the mill and passed through the double cone chamber rotating with the mill, where the coarser particles are dropped and brought back to the mill for finer grinding. The finer particles go to the air classifier, where another separation is made, the desired finer size going to storage and the coarser returned to the mill. Adjustments on the separator permit different sizes to be made, ranging from 99% through 200-mesh to 95% through 325-mesh. A quite complete description of this mill may be found in "Part VI, Air Separation Methods Used in Fine Grinding of Rock Products," published August 20, 1927. The mill has a capacity of 1½ tons per hour of 99% through 200-mesh (pottery grade silica sand). A 150-hp. gas engine is used to drive the mill and a 30-hp. 1750-r.p.m. squirrel cage motor drives the No. 45 Claradge exhaust fan on the air separator.

The pulverized products are drawn to the conical collector at the top of the building and discharged to a spiral screw conveyor emptying into wooden storage bins. The screw conveyor and belt conveyor running from the screening plant are both driven by an Allis-Chalmers 5—3-hp., 220-v., 1140-r.p.m. electric motor. A sacking arrangement is provided on the bottom of the four bins which hold the different grades of pulverized silica. The sacked product is stored on the floor or loaded out to cars placed on a track paralleling the bin side of the building. All grades from 100-mesh to 325-mesh are made in the pulverizing mill.

The sands stored outside are reclaimed by a Bucyrus Model 31 steam shovel on caterpillar treads, which loads a track hopper along the loading track. The hopper feeds to a small Link-Belt portable gasoline loader, placed inside the car, which piles the sand in the car. By shifting the loader and regulating the speed of its belt, all parts of the car can be loaded evenly. Bin-drained sand is drawn directly from the bins by a flume and passed to the track hopper, where the same procedure as above is followed. The dried sands are carried from their bins by the launders to the car and loaded out



The four-cylinder gas engine driving the generators producing power and light in the pulverizing plant

directly, the cars being lined with paper car liners previously.

Power Plants

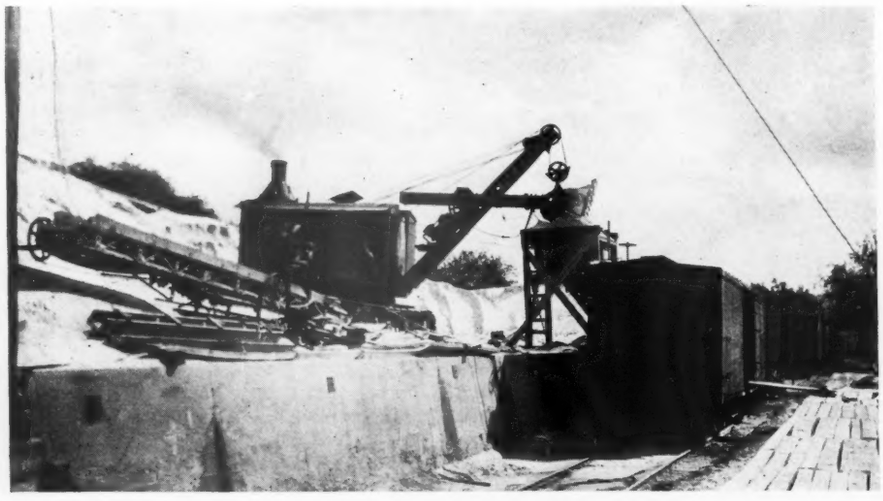
There are two separate power plants, one to drive the wet end operations and the other driving the pulverizing plant equipment. The wet end power plant is housed in a small room adjoining the wet pan and screw washing equipment. It contains two gas engines, a Reeves 4-cylinder generating 150 hp. which is direct connected to a Western Electric 95-kw., 975-r.p.m. motor generator and a Bruce-Macbeth 50-hp. engine. The generator drives the main shaft, from which jackshafts and other belt drives are used to operate the wet pan, screw washers and conveyor belt. The gyratory crusher is direct driven by an electric motor. Power for the Ingersoll-Rand type ER-1, 245-cu. ft. single-stage air compressor is supplied by the 50-hp. gas engine. The switchboard has Weston and Westinghouse a.c. and d.c. recording instruments.

The power unit for the pulverizing plant is located within the building and comprises a 150-hp. Bruce-Macbeth 4-cylinder, 275-r.p.m. gas engine. This engine drives a Fairbanks-Morse 75-k.v.a., 230-v., 1200-r.p.m., 3-phase alternator which is connected by a Hill friction clutch to the driving shaft of the pulverizer. The alternator also furnishes the current to drive the fan motor of the air classifier. A Peerless 3-kw., 110-v., 1750-r.p.m. d.c. generator, belt driven by the gas engine, is used to supply lighting current for the plant. An auxiliary air compressor, a Curtis No. 6, has been installed to supply air to the quarry in case of breakdown or shutdown at the other power plant.

The Ayers Mineral Co. produces over 30 grades of molding sand in its nine mills. The Central Silica Co. however specializes on high grade glass, core, furnace bottom, setting sands and pulverized silica for the ceramic and foundry industries. All sands, wherever produced by the Ayers company, are marketed as Ayers Certified Sands and guaranteed to meet definite physical and chemical specifications.

The Ayers Mineral Co. has been engaged in the silica sand business since 1884. In that time it has grown to be one of the best known producers of the Ohio district. Its pulverized silica products, particularly the silica flour, are shipped to all parts of the United States.

E. M. Ayers, the founder of the company, is president; D. L. Croskey, general superintendent, and M. E. Croskey, plant superintendent.



Car-loading sand from outside storage

Rock Products Industries Active in Georgia

THE annual cement output of three Georgia plants is sufficient for the construction of more than 700 miles of 18-ft. concrete road, which is more than 100 miles over the total constructed by the state highway department since its organization, S. W. McCallie, state geologist, reported at the quarterly meeting of the state board recently.

The report covered the quarter ended August 31, 1927.

Considerable impetus has been given to granite quarrying in the Elberton district by the closing of a contract for shipment of granite to Cuba for the construction of the national highway, from one end of the island republic to the other, the geologist reported.

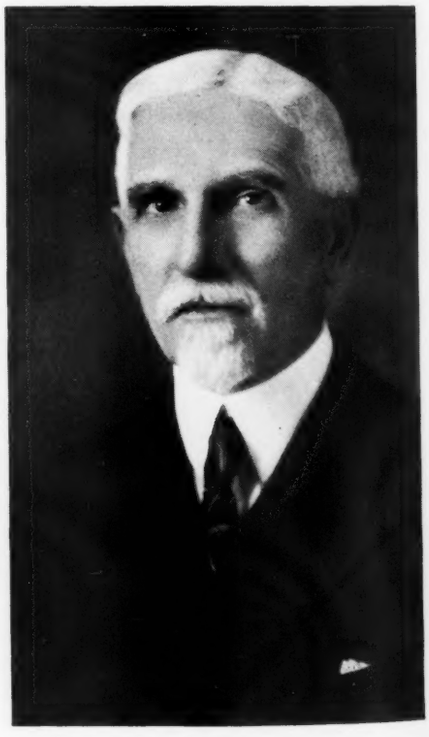
Mr. McCallie reported on several field trips during the three-month period, looking over quarrying and mining industries in Pickens, Polk, Bartow, Elbert and Lumpkin counties.

"I found the marble industry at Tate in flourishing condition," he said. "The value of the output for the present year will probably exceed that of last year by many thousands of dollars. At Whitestone a new plant has been put in operation which should materially increase the annual output of the district.

"The two cement plants near Rockmart are being operated at full capacity. The maximum production of these two plants is approximately 3000 bbl. of cement daily, which is sufficient to build one mile of 18-ft. concrete road. In other words, the output of these two plants, according to this estimate, is sufficient to build 365 miles of concrete road annually. In case we add to the output of these two plants the production of a plant in Houston county, near Perry, which has a daily capacity of 3000 bbl., the total annual output for the entire state would be sufficient to build more than 7000 miles of concrete road per annum, which mileage is greater by more than 100 miles than the total mileage of concrete roads built by the state highway department since its organization.

"A plant near Cartersville which is engaged in the hydrated lime and crushed stone business was found to be quite active. This is the only plant in the state at present producing lime, although the amount of stone found in the state suitable for the manufacture of lime, both in northwest Georgia and south Georgia, is practically inexhaustible.

"The granite industry in the Elberton district has been greatly stimulated in the past month or two by the closing of a large contract for the shipment of granite to Cuba for highway construction. The contract, it is said, calls for many millions of Belgium rock to be used in the construction of a central highway from one end of the island to the other, involving the expenditure of many millions of dollars. To complete the contract will require two or more years.



E. M. Ayers, founder of the Ayers Mineral Co.

Large Crushing Plant That Uses No Rotary Type Screens

Mohawk Limestone Products Company Also Has Rotary Kiln Lime Plant

General view of the crushing plant and rotary-kiln lime plant of the Mohawk Limestone Products Co.

THE business of the Mohawk Limestone Products Co. is about two years old. Its history is quite different from that of the ordinary crushed stone or lime burning enterprise, in that it did not grow out of an older or smaller business. The quarry site was found and prospected and the quarry opened at once for large scale production. In the same way the plant was designed and built to produce as large a tonnage as the market would justify, and it was planned from the first to work up everything that came from the quarry into products that would bring the highest price. There has never been any accumulation of screenings to dispose of, for the coarser part of the screenings has been burned in a rotary kiln to make lime and the finer part ground to agricultural limestone from the first.

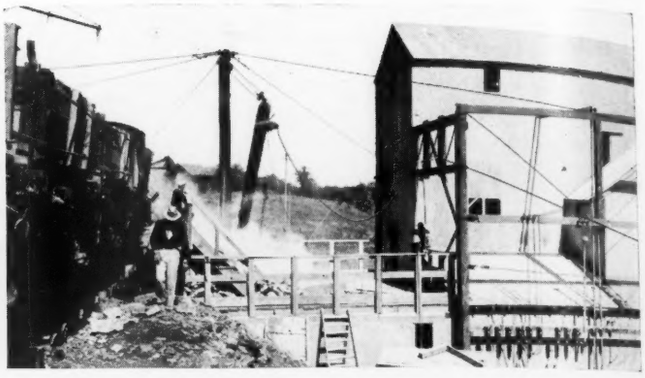
Quarry and plant are at Jordanville, about eight miles from Mohawk, N. Y., where the general office of the company is located. The ledge is of dark blue high-calcium limestone. It outcrops on a hillside and in the year or more that the plant has been producing steadily the hill has been cut back to make a face 60 ft. high and about 700 ft. long. There is little overburden; it varies in depth from 6 in. to 2 ft. and can be easily taken care of by hand work and trucking.

Quarry Practice

Holes are put down with Sanderson-Cyclone drills, 15 ft. apart and with 20 ft. burden, which, it is expected, will be increased to 25 ft. The rock breaks so well that little secondary shooting is needed. Two

Quarry of the Mohawk Limestone Products Co., Mohawk, N. Y.

Quarry train on track above primary crusher



Dumping cars to primary crusher

Marion No. 37 electric shovels load the broken rock into 6 yd. cars, some of which are "Westerns," and the remainder Killburn and Jacobs make.

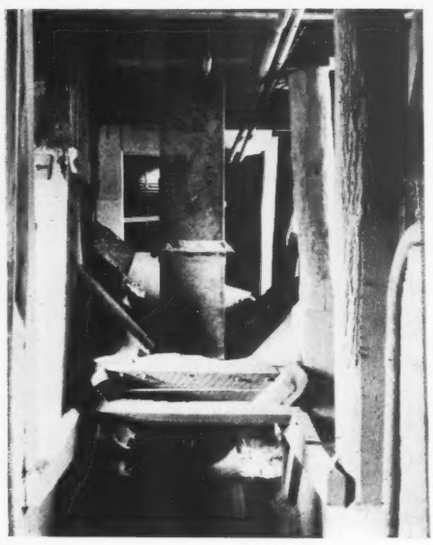
Originally the rock was pulled into the plant by electric locomotives which took current from a trolley wire. But these were not found to be well adapted to the work, so last year two Vulcan 20-ton steam dinkeys were substituted for them. The company, in addition to these, has a 65-ton Baldwin locomotive which is used to switch cars.

Outside storage facilities have not yet been entirely completed but it is planned to have convenient places on the property for general storage. A Lorain "75" gasoline tractor-crane has been recently purchased to handle material out of storage. The quarry run dust which is used for ball mill and kiln feed will be stored in the steel storage building at the plant. This building is 50 ft. wide and 350 ft. long; the first 80 ft. of which is roofed and sided with corrugated iron to house the new dryer installation.

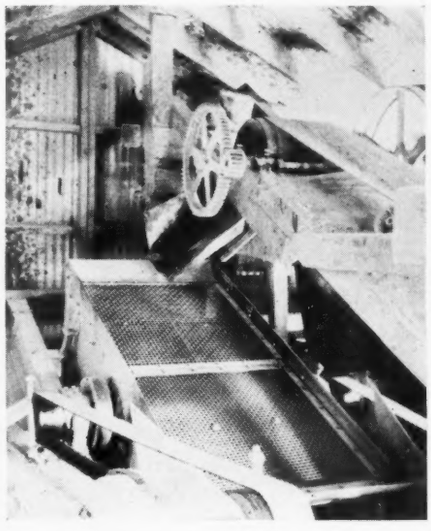
The Crushed Stone Plant

The plant was located to take advantage of the hillside below the quarry. The cars coming in on the level of the quarry floor can dump directly to the primary crusher, which is a 30-in. Superior-McCully, made by Allis-Chalmers. Everything goes through this crusher and passes from it to a 42-in. pan conveyor which lifts it to a live-roll grizzly. Both grizzly and conveyor were made by Allis-Chalmers. The grizzly is set to reject everything over 1½-in. in diameter and send it to a bin with three spouts. One leads to a 13-in. McCully crusher, a second to a 12-in. Gates crusher and the third to a 36x24-in. Jeffrey hammer mill. But this last is used only as a recrusher and is not run while the other crushers are working.

The 30-in. primary crusher has a 125-hp. motor; the 13-in. crusher, a 100-hp. motor, and the 12-in. crusher a 50-hp. motor. These,



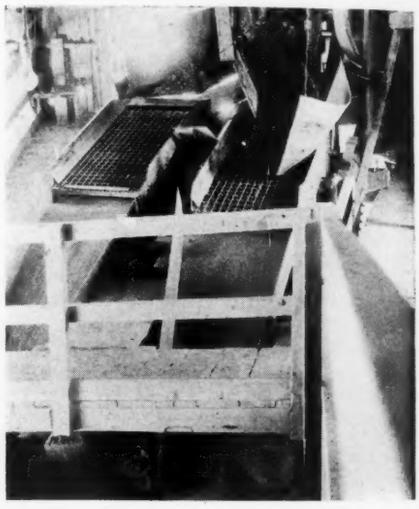
Chutes under live-roll grizzly



Secondary vibrating screens

and all the other motors in the plant, are of Allis-Chalmers make. The crushers and motors and the grizzly are all in a single building, the primary crusher house.

The undersize of the live roll grizzly and the discharge of the 12-in. and 13-in. crushers go to a 30-in. conveyor belt, 122 ft. centers, with a 17 deg. inclination. This carries everything to two Niagara vibrating screens, each having three decks, in the screening plant, a separate building. The upper deck has 2½-in. square meshes, the middle deck 1½-in. square meshes and the bottom deck ½-in. square meshes, wire cloth being used on all three decks. The oversize (plus 2½-in.) goes back to the 13-in. McCully crusher, already mentioned, by way of a 24-in. conveyor of 114 ft. centers. "No. 3" Stone (2½-in. to 1½-in.) and "No. 2" stone (1½-in. to ½-in.) are sent directly to bins from these screens. The



Primary vibrating screens

remainder passes by a 50-ft. conveyor to two Niagara vibrating screens which make "No. 1" stone (½-in. to ¼-in.) and screenings, ¼-in. down to dust. The No. 1 stone goes to bins and the screenings go by an 18-in. belt conveyor, 250 ft. centers, to the lime and agricultural limestone plant.

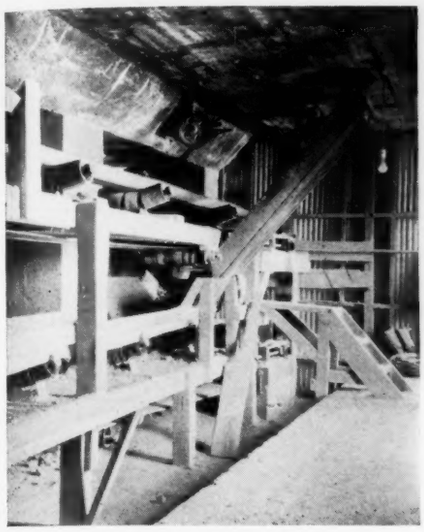
All the conveyors mentioned, except the 18-in.-250-ft. conveyor, run at 320 ft. per minute. The 18-in. conveyor runs at 150 ft. per minute.

The screening system described above is a considerable change from the original installation. In the original plan all the sizing of crushed stone was done by a 30-ft. revolving screen, 60-in. in diameter. This was found to be wanting somewhat in flexibility and the vibrating screens were substituted with an improvement in the ability to make changes of sizes and also in the cleanliness of the product.

Drying Plant to Be Built

Another change is contemplated which is

to be installed shortly. The screenings instead of going directly to the lime and fine grinding plant are to be sent to the drying plant which is to be erected in the storage building referred to above. This will contain one Ruggles-Coles dryer. Drying the stone will have three advantages. It will permit better screening to separate the fines from the kiln feed, which will make the burning easier and give a higher capacity to the kiln;



Conveyor under the stone bins

it will give an increased output to the mill grinding agricultural limestone, for the same power, and it will make the handling easier. The rock has rather marked self-cementing properties and the damp screenings tend to agglomerate into hard masses.

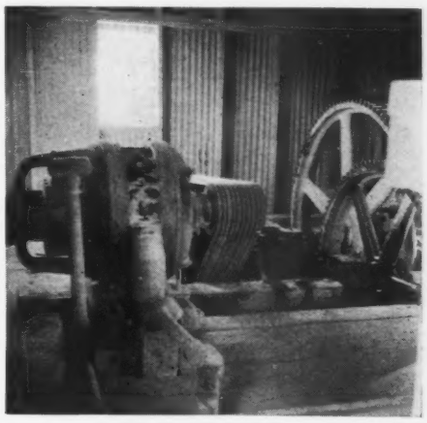
The vibrating screens mentioned are erected on top of six bins which are silos 16 ft. in diameter and 20 ft. high. They are made of concrete silo blocks of the Crane type, a standard block used for building form silos and coal pockets. The blocks are hooped on the outside with round steel hoops. This form of construction is somewhat cheaper than poured silos, where the blocks can be locally obtained, and has greater durability and is more fireproof than wood stave construction. All the bins in the plant are silos made of this block.

The screening plant over bins. (The bins are silos of concrete block)

A 24-in. belt, about 300 ft. long altogether, goes below the bins and then up the same gallery that holds the 18-in. belt that carries the screenings. This discharges to a short cross conveyor that delivers to a hopper set over the sidetrack which serves the plant from which the crushed stone is loaded into railway cars. The gates feeding the long belt from the bins are arranged so that a single size or mixtures of sizes may be loaded. A considerable part of the output of crushed stone is "state mix," a mixture of sizes acceptable to the state highway commission for concrete highway aggregate.

Agricultural Limestone Plant

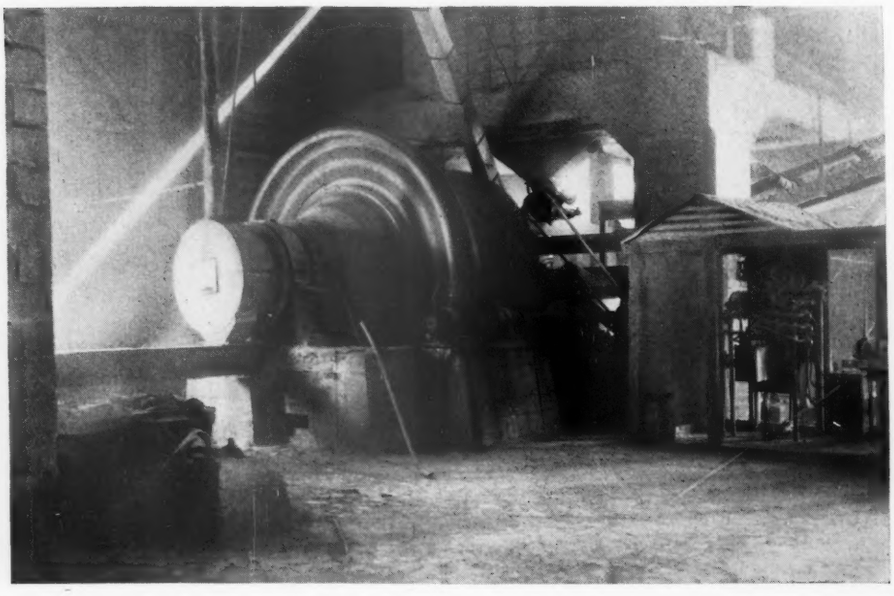
The screenings, ¼-in. and finer, coming from the crushed stone plant on the 18-in. belt, 250 ft. long, fall on a Niagara vibrating screen covered with ⅛-in. square mesh wire cloth. The 16x20-ft. silo below is divided and one half gets the oversize (kiln feed) and the other the undersize which is fed to the mill for grinding to agricultural limestone. This is a Hardinge mill, 8 ft. long and 48-in. dia. The product falls to a covered screw conveyor and this discharges



One of the main elevator drives

Elevator in front is for returning rock for recrushing. Elevator behind carries rock from crusher to screening plant

Primary crushing plant from another angle; conveyor at left leading from crushers to screening plant



Mill for grinding agricultural limestone. Belt at the left carries feed to the kiln

into a second screw conveyor at right angles, which takes it to the boot of an elevator 60 ft. high. This discharges on a Niagara vibrating screen covered with 60-mesh cloth. The oversize goes back by a metal chute to the mill and the undersize falls into a silo 16 ft. in diameter and 24 ft. high. Although the screen which separates the oversize is 60-mesh, the product is so fine that 95% passes 100-mesh. It is sold for both agricultural limestone and asphalt filler and finds a considerable part of its market in the vicinity of the plant.

Below the 16x24-ft. silo is a Bates three-valve packer, by which ground limestone is sacked for shipment.

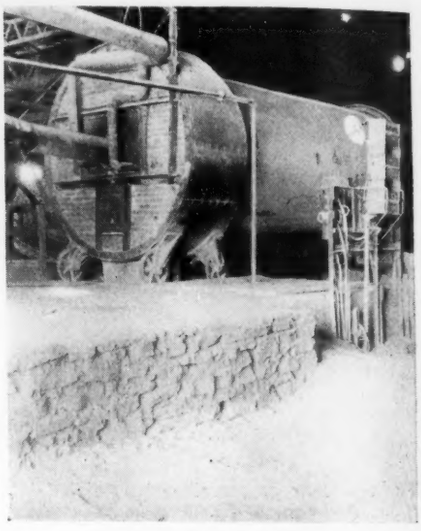
The production of agricultural limestone is 100 tons per 12-hr. day and this can be handled by the screen mentioned. An increase, however, would call for the installation of a second screen. Space has been left for this and space has also been left for the installation of a second ball mill and additional silos for storage of the ground product.

Lime is burned in an 8x110-ft. Vulcan rotary kiln. The feed (¼-in. to ⅛-in.) comes from the coarse side of the divided silo mentioned above by way of a 24-in. conveyor belt of 71-ft. centers. It is fed to the belt by a feeder, taken from a Jeffrey hammer mill, which insures a uniform feed to the kiln. The fuel used is pulverized coal which is prepared by an "Aero-pulverizer" set about 20 ft. in front of the kiln. The coal comes from a 16x24-ft. silo above the pulverizer and is fed to it by a feeder that is an integral part of the machine. A curved pipe takes the powdered coal from the pulverizer to the burning pipe of the kiln, air being furnished by a fan that is also an integral part of the machine.

The burning of the lime is controlled by a Brown recording pyrometer and by taking samples at short intervals and testing for core. The continuous record of the pyrometer is taken off at the end of each shift and the amount of core found in each hourly sample is recorded at the proper place on the chart. This record allows any unusual condition to be checked at once.

The lime goes from the kiln to a cooler which is of an unusual type. It consists of a box made of steel plates on two light I-beams. This box is set at an inclination of about 15 deg. and a drag conveyor, 46 ft. long, drags the hot lime over it. The box is kept full of cold water by a pump, and the water running away carries a good portion of the heat in the lime with it.

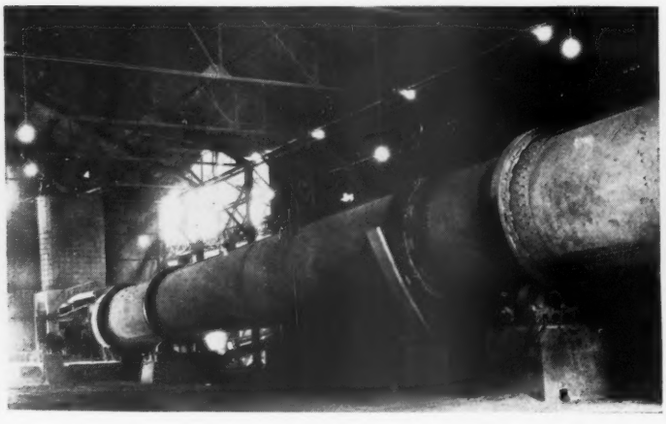
At the end of the cooler the lime falls to the boot of a 45-ft. elevator which lifts it to a 16x20-ft. silo. Below this silo is a 24-in. conveyor of 70-ft. centers by which the burned lime may be loaded into railway cars.



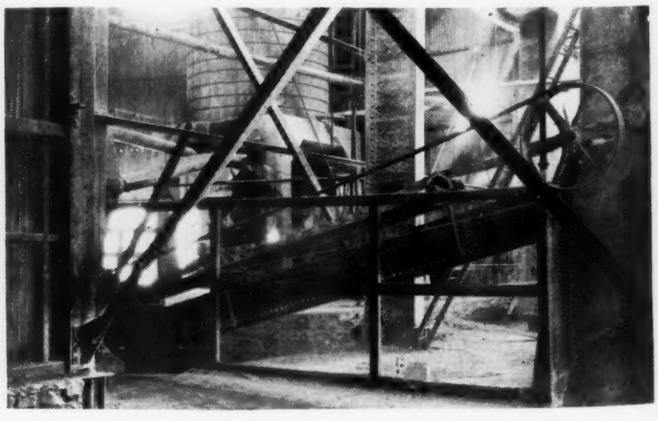
Hood of lime kiln, showing pipes for air and powdered coal

Hydrating Plant

Feed for the hydrating plant is drawn from the silo mentioned above and lifted by a 45-ft. elevator to a steel bin. From this it runs by gravity to a Clyde weighing hopper and then to a Clyde hydrator. The hydrated lime goes to a third 45-ft. elevator which lifts it to a Niagara vibrating screen, with 30-mesh wire cloth set over two 26x20-ft. silos. There is a Bates three-valve packer below these by which the hydrate is packed for shipment.

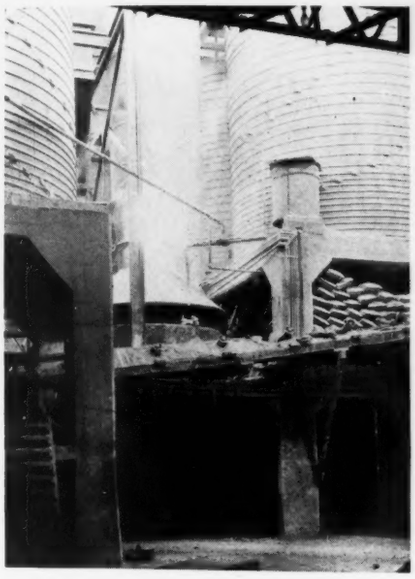


The 110x8-ft. lime kiln. Pulverizer under silo at the left makes powdered coal



The cooler. Lime is drawn by a drag conveyor up the inclined box cooled by circulating water

At times when the crushed stone plant is running light, as in the winter season, the lime plant has to be fed with stone crushed from coarser sizes. This is taken either from the bins or from the stone storage. In either case it is loaded into cars which are discharged into a track hopper near the screening plant. A 24-in. conveyor of about 115-ft. centers takes the stone to the hopper over the Jeffrey hammer mill mentioned above. The mill discharge goes on a belt to the screens and the oversize is sent back, as in the ordinary crushed stone operation. This is easily done because the hopper for the hammer mill is the same hopper that feeds the 13-in. McCully with the screen oversize



Hydrator and bins for quicklime and hydrated lime

in ordinary operation. Closing off the chute to the 13-in. crusher sends everything to the hammer mill, so the same screens and elevators serve for recrushing as well as for normal plant operation.

The plant is on the line of the Southern New York electric railways and all shipments are made over this line.

The plant design and layout was made by Ellis Soper, consulting engineer, of New York City. The plant is very well built. All the buildings are covered with "Armco" iron and everything is set on high concrete foundations. An unusual feature of the construction is the use of concrete blocks for elevator enclosures. These are used throughout the lime plant and are considered a great improvement over wood construction. The blocks

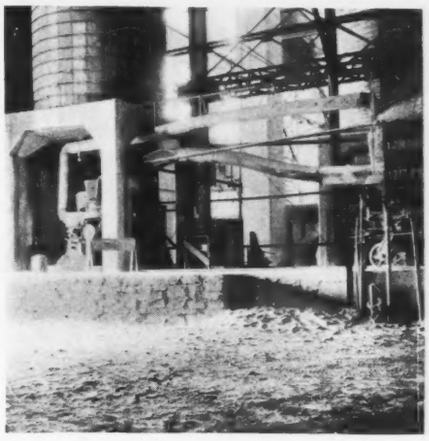
Floor of hydrating plant. Note elevator of shaft of concrete block (center)

were made at the plant from screenings.

The company also conducts a sand and gravel operation, about 45 miles distant from the lime and stone plant, at Bloods Mills.

The officers of the company are: A. J. Stratton, managing director; L. A. Poston, manager; D. W. Finch, general superintendent, J. W. Dugan, assistant superintendent.

M. W. Finch, the son of the superintendent, is plant engineer; Stanley Carey is quarry foreman, and George Marshall is lime plant foreman.



The coal pulverizer. Silo coal bin above

Farm Operations of Magnesite Company Profitable

FARMING as a sideline is not ordinarily associated with a corporation such as the Northwest Magnesite Co., but ever since the settlement of the damage suits against the company here, resulting from claims that dust from the plant had ruined crops and land, the plant has carried on farming operations on the land leased and purchased.

This year, according to A. B. Rogers, the land has yielded abundantly over 6000 bushels of grain being harvested, besides a quantity of hay. The wheat crop this year averaged 30 bushels to the acre for a total of 5157 bushels, and rye went 25 bushels to the acre for an aggregate yield of 1336 bushels. The wheat was sold direct to the Sperry Flour Co. in Spokane, and the rye was shipped to a coast firm.

Some 150 tons of alfalfa will be harvested and over 20 tons of timothy were also taken from the company land. It is, perhaps, the largest aggregate crop ever harvested by the company, though the yields per acre have been exceeded in other years.

D. W. Finch in center, M. W. Finch at left, and J. W. Dugan in rear

Gravel Plant Washing and Screening Equipment and Design

Part V—Types of Crushers

By Hugo W. Weimer
Consulting Engineer, Milwaukee, Wis.

WHILE it is true that gravel is much more abrasive and requires more pressure to break than the ordinary limestone, its very nature makes it an ideal crushing proposition for either a gyratory or jaw type of crusher, because it permits of maximum capacity of the crusher used and furthermore the danger of packing in the crushing bowl and causing breakage of the machine is not near as great as when crushing limestone.

The majority of sand and gravel plants find it necessary to crush a part of their material, either because of the large percentage of the deposit which is oversize, or because the material specifications require a certain amount of broken stone. For the average plant the choice of type usually lies between the gyratory crusher and the jaw crusher for either primary or secondary crushing, although for the latter the gyratory is by far the most popular.

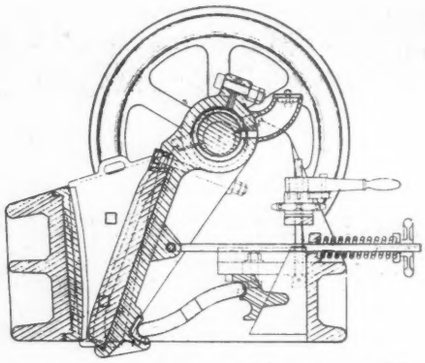


Fig. 4. Jaw crusher with one movable jaw and greatest movement at the top

Modern Design Jaw Crusher

Fig. 1 illustrates a modern design of jaw crusher which was developed from the original Blake type jaw crusher, and is suitable as a primary crusher only. It has one fixed and one movable jaw, the latter being pivoted at the top, having its greatest motion at the bottom. The toggle arrangement for imparting the motion provides a good leverage action which together with the flywheel on the drive shaft makes this crusher suitable for the hardest kind of gravel.

One design of gyratory breaker suitable for primary crushing is shown in Fig. 2. This is a recent design of the type with the shaft pivoted above the head and with the eccentric, which gives the motion, below the head. This crushing principle is an old one and most operators are familiar with its design and action.

For either primary or secondary crushing the parallel motion gyratory crusher may be used. Fig. 3 illustrates this type as designed for fine crushing. The eccentric being placed between the head and shaft makes possible

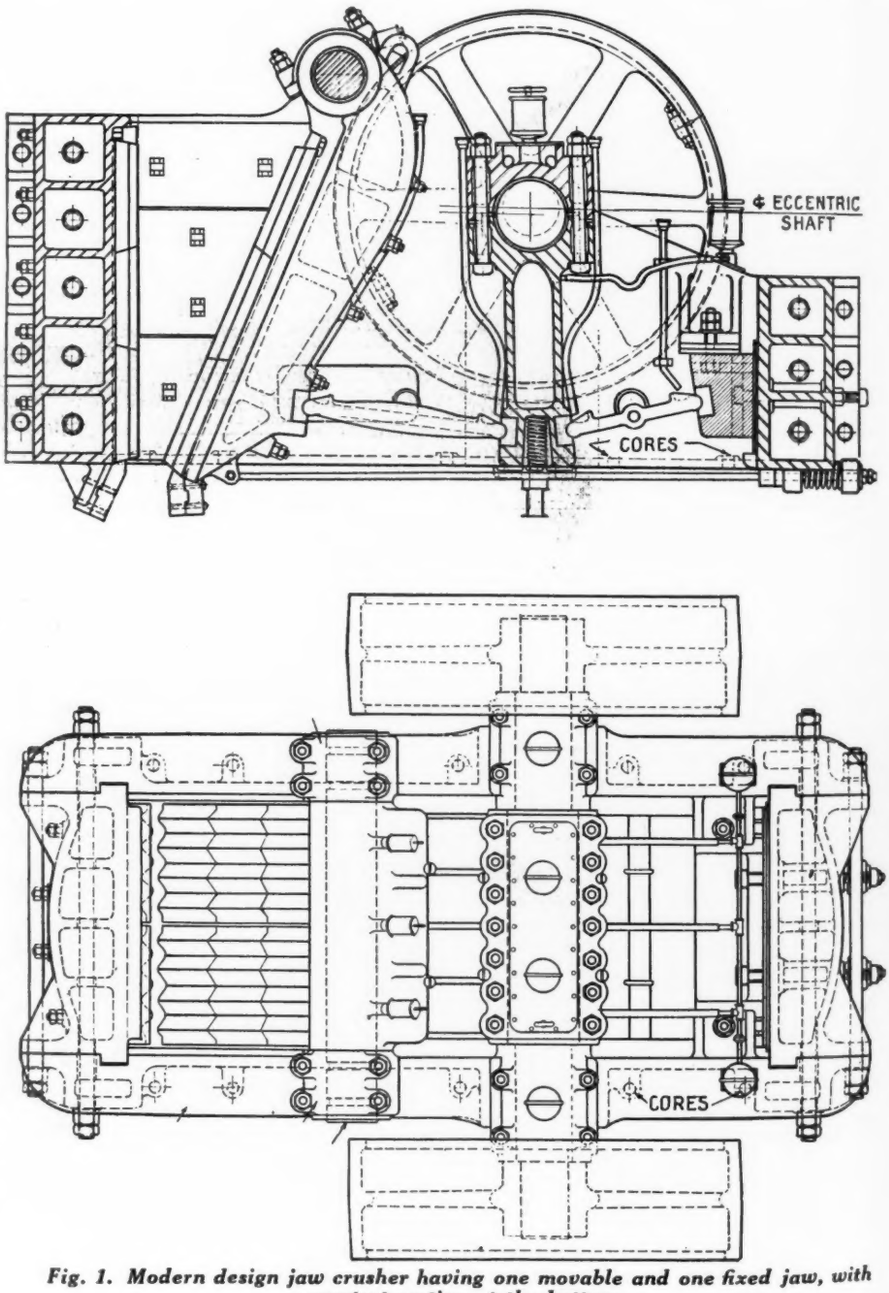


Fig. 1. Modern design jaw crusher having one movable and one fixed jaw, with greatest motion at the bottom

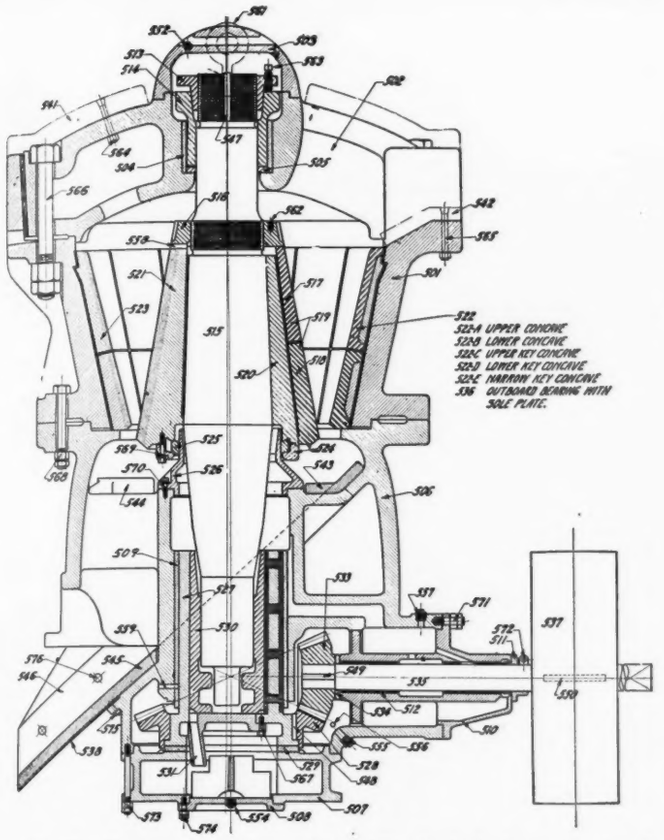

522A UPPER CONCAVE
522B LOWER CONCAVE
522C UPPER KEY CONCAVE
522D LOWER KEY CONCAVE
522E HARDRIP KEY CONCAVE
536 OUTBOARD BEARING WITH SOLE PLATE.

Fig. 2. Gyratory crusher with shaft pivoted above the head and the eccentric below

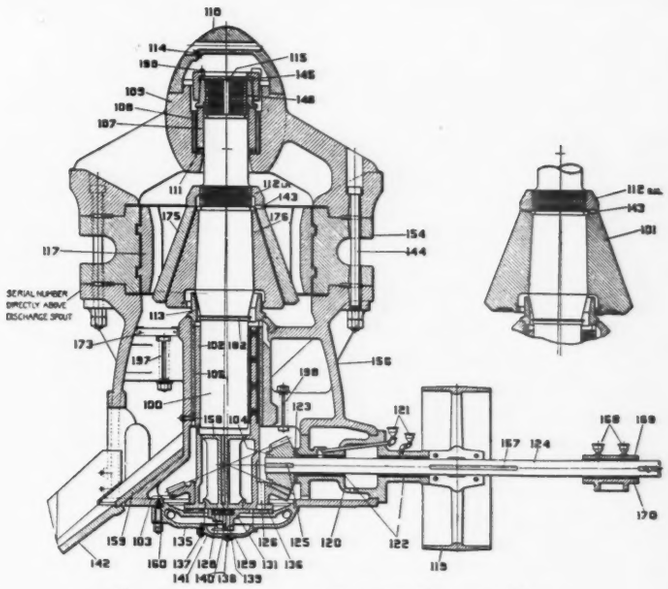


Fig. 5. Gyratory crusher for fine crushing

the use of a short main shaft. All changing of parts such as eccentric, etc., is done from above, which is a desirable feature when the machine is placed directly above a belt conveyor.

A jaw type of crusher giving good results as a secondary crusher in gravel plants

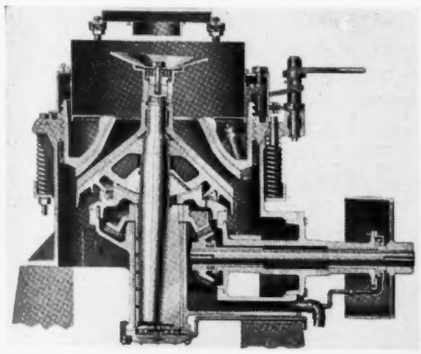


Fig. 6. New type of gyratory crusher in which the closed side regulates the size of product

is illustrated in Fig. 4. It is a modification of the old Dodge type with one fixed and one movable jaw having the greatest motion at the top of the crushing chamber. The cut shows the movable jaw supported directly from the eccentric shaft above and having a toggle support at the bottom which takes care of the vertical movement of the jaw. A recent improved design of this type of crusher using roller bearings in the eccentric and frame bearings allows of greater speed, which increases the capacity and at the same time results in power saving owing to the use of anti-friction bearings.

Fig. 5 shows a design of the gyratory crusher with the shaft pivoted above and having the crushing chamber arranged particularly for fine crushing, otherwise being similar to Fig. 2.

A recent addition to the gyratory crusher family is illustrated in Fig. 6. It apparently is new and novel in design and operation. The crushing head, which is in the shape of a cone, is mounted on a shaft which in turn is supported in an eccentric, giving a gyratory motion to the head. The design of the crushing bowl is such that the closed side of the chamber regulates the size of product rather than the open side, which is the case with other designs of gyratory crushers. The primary crushers of the present day seem to meet all requirements but the ever increasing demand for fine crushed gravel has resulted in a great deal of designing and experimenting with crushing equipment that will have greater capacity with lesser power requirements than the old type of jaw or gyratory breakers for secondary crushing. Fig. 6 illustrates one of these developments, while a number are in an experimental stage.

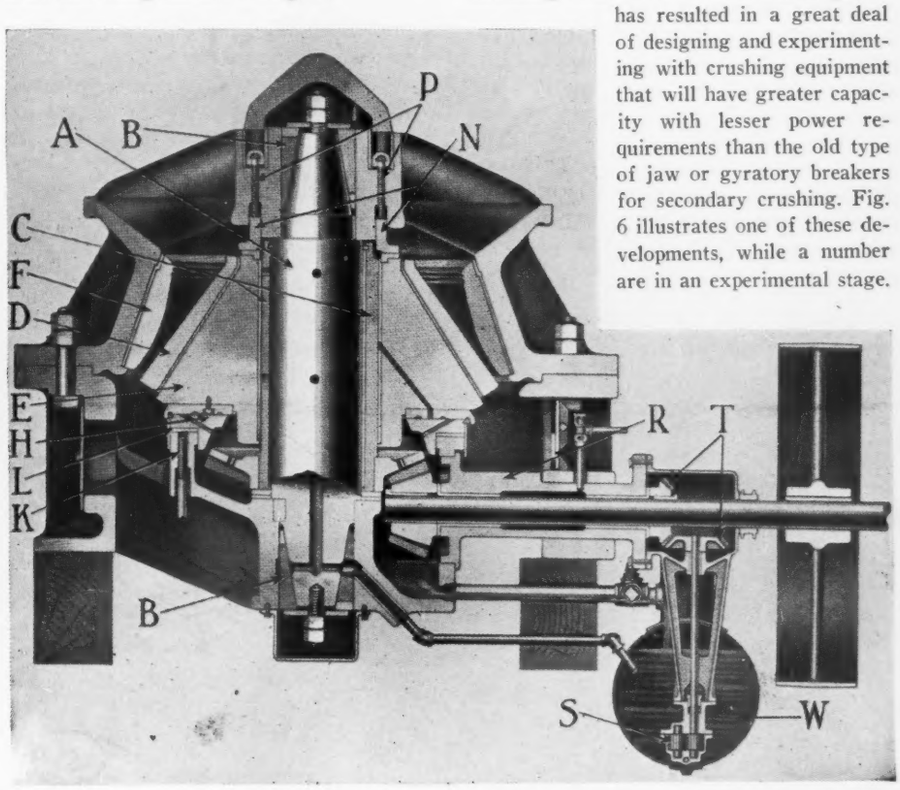


Fig. 3. Parallel motion gyratory crusher with eccentric between head and shaft, permitting a short shaft

Quarrying Virginia Soapstone

New Type of Undercutter Used at the Alberene Quarries of the Virginia Alberene Company

ALBERENE stone is the commercial name given to the metamorphic massive rocks of the serpentine group found chiefly in Virginia. The deposits are in ovoid masses of different degrees of hardness and purity, varying from common soapstone to serpentine so hard as to be almost unworkable. The rock is generally overlaid with a burden which for the greater part is usually an inferior and unmarketable grade of soapstone. The alberene stone in its finished form finds a wide variety of uses, chiefly in the chemical and electrical industries.

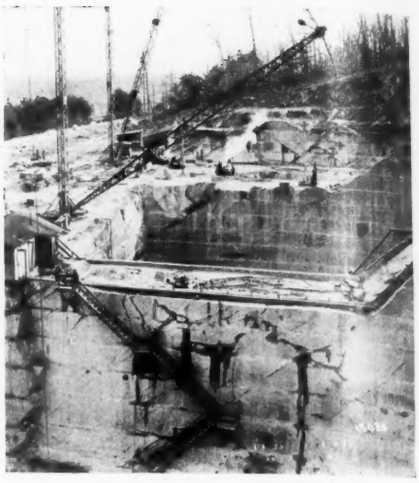
The Virginia Alberene Corp. is one of the large producers of this variety of soapstone. Its quarry at the largest deposit in the world is located in Nelson county and has been worked successfully over a number of years. Until 1925, the usual type of coal undercutter was used in quarrying, but in June of that year a long wall coal cutter manufactured by the Jeffrey Manufacturing Co., Columbus, Ohio, was installed at one of the pits with notable success. This machine with a 4-ft. cutter has replaced five steam undercutters in Pit No. 36. At the present time operations at the pit have been carried down 75 ft. deep and 100 ft. square, all with the longwall cutter. Another machine of this type was installed at the No. 40 pit in January, 1926, raising the average undercutting of the alberene stone to 200 tons in a nine-hour day. These two machines supplanted eight steam undercutters previously operated.

The longwall cutter for undercutting stone is an adaption from coal mining practice. The machine consists of a heavy motor-driven and steel-belted chain turning around a sprocket and shoe at opposite ends of a cutter bar. This bar pivots from one end of a steel frame housing the motor and driving gears. The cutter pulls itself along the quarry face by winding up an anchored cable. The chain links carry pointed bits and as the cutter bar is pulled through the rock the motor-driven chain and bits saw out the long, narrow cut called the "kerf." Oil is squirted on the chain during cutting.

Quarrying

After removal of overburden, the first gateway in the workable stone is cut by splitting out wedge-shaped blocks that are larger at the upper end so that the hoisting cable can grip them. This leaves the gateway bottom uneven. On making the first cut the machine keeps to a level by running on wooden skids which are laid in place by the machine runner as the cutter slowly advances. The subsequent cuts are made on the floor already leveled by the cutter, and very little skid laying is necessary. Alberene stone is quarried in blocks undercut 4 ft. and channeled 6 ft. deep. The cuts run the entire width of the quarry and the overhanging stone is supported by wedges of wood driven into the kerf. The separate blocks, weighing from five to 12 tons, are split off at lines of drill holes sunk in the face parallel with the grain. The stone is much tougher than bituminous coal and does not fracture easily. For these reasons, several interesting modifications in the cutting equipment have been introduced to make chain-cutting practicable. The chain is put under a tension of about 1000 lb. so as to be quite tight and prevent the bits from chattering and thus bending and breaking when they strike against streaks of quartz or flint in the stone. This was accomplished by replacing the steel wearing shoe in the end of the cutter by a roller-bearing mounted roller. A new design of chisel-shaped stellited low-carbon steel bits, patterned to bite ½ in. wide by ⅛ in. deep and cutting a kerf 5½ in wide, are used with the cutter. The stellited bits are welded in the company's own machine shop. They have been found to be quite efficient and economical in this operation.

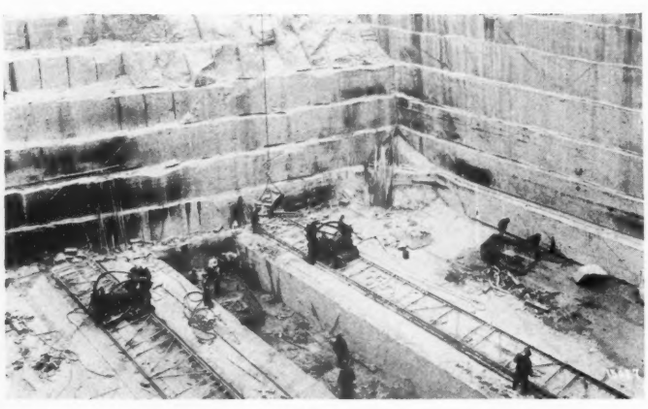
The change in quarrying methods has produced effective reduction in costs, notably in labor—only four men being required to operate the two "Longwall" cutters against 16 necessary for the eight steam undercutters. It has been suggested that the cutter be used for channelling, but so far this has been carried out in nearby quarries of the Standard Soapstone Corp. with only fair success. At present they are best fitted for stripping off the softer rock of the overburden. This is the only illustration of the cutter being used in non-metallic mineral mining, but it is thought that its use might be extended in mining raw material which is hard to shoot and which is best handled in large lumps resulting from shooting after undercutting.



Pit 40 of the Virginia Alberene Corp.

Canadian Mica Production

SHIPMENTS of Canadian mica in 1926 amounted to 2545 tons valued at $229,204, according to finally revised statistics just issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. In 1925 the production was 4020 tons at $261,463. The principal decrease in 1926 was recorded in the shipments of scrap mica. Exports of rough-cobbed and thumb-trimmed mica amounted to 44 tons; splittings, 315 tons, and scrap and waste, 3799 tons.



Looking down into the quarry. The undercutter is placed on the bottom of "gateway" in lower center

The motor-driven cutter starting to undercut a section of the alberene stone

Air Separation Methods Used in Fine Grinding of Rock Products

IX.—Conclusion.—Methods of Testing

By Edmund Shaw
Editor, Rock Products

Determining the Size of Very Fine Particles

In checking the work of air separators screens have been universally used in a practical way. Reports are made usually as to the amount remaining on either a 200-mesh or a 325-mesh sieve. The 325-mesh sieve is about the finest that it has been found practical to make, although some 400 mesh sieves have been made and used for laboratory work. Even the 325-mesh screen demands much care and skill in its use, so that one operator will check another or even that the same operator will check himself. However, the sieve is not liable to be displaced in ordinary reporting as everyone understands the method of testing and those familiar with the products have a fairly clear picture in mind when such a product as "85% passing 200-mesh" is mentioned.

But in the last four or five years a demand has arisen for a method that would determine the size of particles below the mesh of the finest screen that could be used. Investigators have worked out several devices for this work based on different principles. Some of the machines for doing this are refinements of air separating devices.

The air analyzer spoken of in an earlier part of this series is such a machine and has been developed to a very high degree by the Bureau of Standards. The same machine is now in use at the laboratory of the Portland Cement Association in Chicago and it is said to be installed in one laboratory belonging to a large cement manufacturing company. In a sense it is the standard machine in the United States for the mechanical analysis of cement, including particles below 200-mesh.

German Air Separator for Determining Fineness

Articles by Albert Hauenschild published in *Zement*, July 1 to July 15, 1926, describe a German device which is a refinement of the centrifugal-air separating device used in commercial work. The design was worked out after some other types had failed to give satisfactory results. As it will be shortly described in Rock Products in connection with its work in determining the fineness of portland cement, it will not be described in detail here. In its action it appears to resemble the Gayco separator more closely than any other. The feed is mixed with air and kept in a whirling motion by a small fan. There is no return of air in a closed circuit as in commercial separators and the whole apparatus is sealed to prevent the entrance of air with the feed. The particles separated into zones (according to their fineness) by the centrifugal action, fall into concentric tanks, in the same way that the products are collected in the centrifugal separator shown in Fig. 6.

A series of four fractional sizes were made and the coarsest and finest particle in each and the size of the average particle were determined microscopically to be.

SIZE IN MICRONS

No. of Fraction	I.	II.	III.	IV.
Finest particles	48.5	9.1	11.1	1.7
Coarsest particles	76.0	51.0	38.8	19.0
Average particles	68.0	19.4	18.0	4.4

For comparison it may be noted that the coarsest particle given above (76 microns) is about the size of a 200-mesh screen opening (74 microns or .074 mm.). The average size of the finest fraction would therefore be about 1/17 the size of a particle that would just pass a 200-mesh screen.

The "flourometer," mentioned in an earlier part of this series, is a very simple form of air separator. It consists of an expanding glass tube into which the sample to be tested is placed and the "flour" blown out by a blast from a mechanical fan. The "flour" is said to be the equivalent of all that passes a 300-mesh screen.

Other Methods of Determining Fineness

G. and T. Earle, Ltd., Wilmington, Hull, England, the well-known British cement manufacturers, have issued a book, "The Making and Testing of Portland Cement and Concrete," in which their laboratory practice is described. While some of the methods of determining the size of fine particles have nothing to do with air separation, they are of interest for comparison. The Messrs. Earle say that they have found sieves finer than 180-mesh to be unreliable, as the mesh suffers greatly from distortion when the fabric is stretched over the frame of the sieve. They have worked out an unusual method of determining fineness which they describe as follows:

"A method known as the 'light method' has recently been worked out in Messrs. Earle's laboratory whereby one sample of cement can be compared with a standard and gives the relative total number of particles present in a given weight. The method is quick and accurate and depends upon the obliteration of a source of light by particles of the cement which are suspended in a standard viscous liquid. With reasonable accuracy a figure can be obtained for the actual total number of particles per gram. Messrs. Earle have found the method exceedingly useful in some of their investigations and there seems to be the possibility of the wider adoption of this method in the fineness testing of cement and powders in general."

A very refined form of apparatus which uses the light method has been developed in this country and used for measuring the fineness of paint pigments. (See *Industrial and Engineering Chemistry*, January, 1927.)

Sedimentation is a much used wet method of determining fineness, especially for such materials as ground limestone and silica, which are not affected by water. The rates of settling of different samples are compared and a scale is made depending on the time required for the mass to settle to a certain volume. To be accurate distilled water should be used and the temperature should be constant, as the settling rate is much influenced by the temperature. The sedimenting agents, such as alum, that are used in clarifying most city waters, bar ordinary tap waters from use. For materials affected by water such liquids as gasoline and alcohol are used.

A recent German device settles the sample in a long column provided with a series of taps so that the liquid carrying the solids may be drawn off at different points. This gives a series of products graded according to settling rate.

Elutriation, the method so much used in soil analysis and for separating many mineral products into sizes, is so well known that it will not be described here.

Efficiency of Air Separators

A system of determining the efficiency of air separators, that seems to be in fairly general use, has been furnished the writer by the Sturtevant Mill Co. It reads:

1. Take a definite quantity of the material fed to the separator. By screen analysis

determine the percentage of material in this sample of the required fineness. Designate this percentage A. The balance of sample is tails or oversize, and designate this percentage B. Thus, $A + B = 100\%$ of feed.

2. Take a definite quantity of the oversize or tailings discharged by the separator. By screen analysis determine the percentage of fines in this oversize, which should have been removed by the separator. Designate C. The remainder is tails; designate this percentage as D. Thus, $C + D = 100\%$ of tailings discharged.

3. To ascertain separator efficiency, multiply per cent of tails in feed B by the per cent of fines in tails C and divide the result by percentage of coarse in tails D, that is, $\frac{B \times C}{D}$. Subtract this figure from the percentage of fines in feed A and divide by percentage of fines in feed A. Thus the formula becomes:

$$\text{Efficiency} = A \frac{\frac{(BXC)}{(D)}}{A}$$

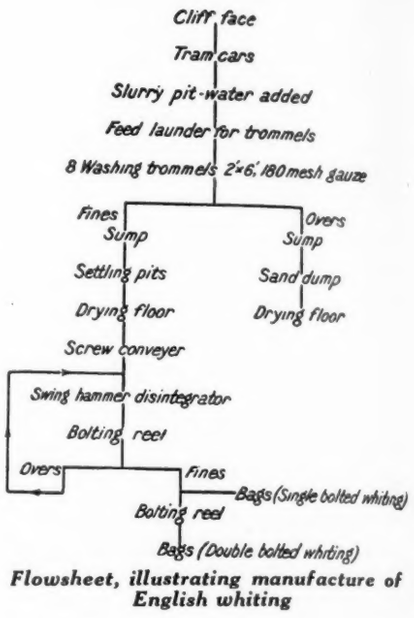
Supposing that $A = 80\%$, $B = 20\%$, $C = 10\%$, and $D = 90\%$, then, substituting these values in the above equation, we have

$$\frac{20 \times 10}{90} = 2.22 \qquad 80 - 2.22 = 77.78$$

$$77.78 \div 80 = 97.22\%$$

efficiency.

This same method is given in an article on air separation by Alexander Oglivie, published in *Chemistry and Industry*, October 8, 1926.



Flowsheet, illustrating manufacture of English whiting

The Manufacture of Whiting in England*

By Hugh S. Spence

AN important seat of the whiting industry in England is in Kent. An upper and flint-free horizon of the same chalk beds is used for whiting as are worked for the manufacture of portland cement. By courtesy of the Cement Marketing Co., who control all sales of both cement and whiting produced in England, I was enabled to visit one of the principal whiting plants. This works is situated at Greenhithe, close to tidewater, on the Thames.

Whiting has been produced here for many years, and the chalk quarry is a large one. Most of the faces are now overgrown, however, and chalk is won at only one point. The chalk is broken out of the face by picks and falls to tram cars, which run it to the works. These are placed in an old part of the quarry excavation and are of small proportions.

Washing and Screening

The chalk, as mined, has a rather dirty, iron-stained appearance, but yields a fine white product. It is shoveled from the cars into a circular stone washing tank 15 ft. in diameter into which a stream of water is led. (The water is the overflow from the settling pits, so that the same water circulates repeatedly.) The tank is provided with a central vertical shaft, fitted with four arms, from which heavy iron bars (rail sections) are hung by chains. These bars keep the slurry in motion, and break up the lump chalk. One side of the tank is fitted with a gate, covered by a ⅛ in. wire screen, through which the slurry flows in a continuous stream. It is led into a launder provided with eight lateral gates, through which it flows to a system of eight open trommels (rotary screens) fitted with 180-mesh wire gauze. The trommels are inclined slightly, and above them runs a perforated pipe line, from which jets of water are directed on to the trommels. The fine chalk that is washed through the gauze falls to a collecting pit, while the coarse chalk and sand are discharged to a sump, whence they are pumped up to a waste launder and run off to the sand pump. This coarse material is dried on a separate drying floor and sold for asphalt surfacing.

Settling

From the trommel pit, the fine slurry is pumped to a launder, which feeds the settling pits. There are four sets of these, with eight pits to each set. The pits of each set are connected up with one another in series. Each pit measures 10x6 ft. and is 8 ft. deep. The slurry enters the first pit, and when this is full flows over a lip into the second, and so on throughout the entire eight. The finer material is thus carried over and dropped in the last four pits, and this constitutes No. 1 grade whiting, while that deposited in the first four pits is graded as No. 2. The overflow from the pits is led back to the washing tank, as mentioned above. When one set of pits is full, the slurry is diverted to another, and the settled whiting is dug out by hand, loaded into barrows and dumped on to the drying floors, which are situated beside the pits.

Drying and Grading

The drying floors are roofed over, but have no side walls. Each floor measures 30x20 ft. and is paved with iron plates, beneath which run the heating flues. These are heated by coal-fired furnaces. The wet whiting sludge is spread to a depth of 10 in. upon the floors and takes about 36 hours to dry. When dried, the whiting is shoveled off the floors into a screw conveyor, which breaks up the soft cakes and discharges to a swing hammer disintegrator. From here it passes to a bolting trommel, the overs from which return to the disintegrator and the throughs to bags. Double-bolted whiting, which sells for $1.25 more per ton than sinble-bolted, is passed through a second trommel before bagging.

In addition to prepared whiting, the best grade of which is known in the trade as "gilders' whiting," crude lump chalk ("cliff stone") is also produced. After air drying, this is shipped out for whiting manufacture elsewhere, chiefly to the United States, where no duty is levied upon crude chalk, whereas prepared whiting pays 25% *ad valorem*.

The crude chalk and whiting are run in tram cars to storage, located a quarter of a mile distant, at Thames-side. Here they are barreled or bagged, loaded into lighters and taken to London docks for transfer to steamer.

*From the *Canadian Mining Journal*.

Texas Lime Production Increased in 1926

ACCORDING to statistics obtained by the Bureau of Economic Geology of the University of Texas in co-operation with the United States Bureau of Mines, lime was produced in Texas during 1926 to the amount of 78,293 short tons, valued at $706,153. This amount represents an increase over the production of the preceding year when the amount was 74,638 tons, valued at $698,132.

Six plants in Texas were engaged in the manufacture of lime during 1926, according to Dr. E. H. Sellards, director of the Bureau of Economic Geology.

Elutriator for Testing Cement

Device Employing a Constant Current of a Circulating Liquid

AMONG the various devices for determining the fineness of portland cement in the sizes below 200-mesh, elutriators (machines employing rising currents of water to lift the finer sizes) have not been very successful. One reason is that another fluid than water must be used and another is that ordinary machines did not guarantee a very uniform velocity to the rising current. The device shown here has been designed to correct both of these defects of elutriators. It was designed by S. Dickson, of the Testing Works and Chemical Laboratories, Broadway House, 24-28 Tothill St., Westminister, London, England.

The difficulty of using another fluid than water has been met by circulating the fluid used and filtering it before returning it to the elutriating tube. The uniform velocity of rising current has been attained by using a very neat form of overflow box (B) in connection with a speed regulator on the pump. With these the "head" on the liquid column may be kept constant through hours of work. The velocity given the current is regulated by using a glass jet (see drawing) as the outflow for the liquid. Jets of different sizes (each carefully calibrated) are used to give the different velocities.

The following is taken from a description of the apparatus which Mr. Dickson has written for ROCK PRODUCTS:

The liquid which I have found to give good results is sold in England under the name of "White Spirit" and is used by painters as a substitute for American turpentine; when tested the specific gravity at 60 F. was found to be 0.792. It begins to distill at 150 C. and 98% distills over at 200 C.

To start up the apparatus the tank A is filled with the white spirit. The motor is then switched on, and the liquid, being drawn by the pump from tank A, is pumped to tank B. After a short time tank B becomes filled to the level of the overflow pipe No. 2. More spirit is then added to bring the level of the liquid to within two inches of the top of tank A. The three-way tap which has remained closed up to this point in the operation is now opened and the liquid allowed to fill the glass vessel. Care should be taken to see that all air is expelled from tube No. 3. When the three-way tap has been closed and the motor stopped, testing may begin.

The determination of the residue in a portland cement is carried out as follows:

Twenty grammes of the sample are weighed and transferred to a beaker of about 200 cc. capacity. Into this beaker is run about 100 cc. of liquid from the elutriator, a similar equal quantity being run off into a wash bottle. The tap of the elutriator is so manipulated as to prevent any liquid entering the vessel from tank B.

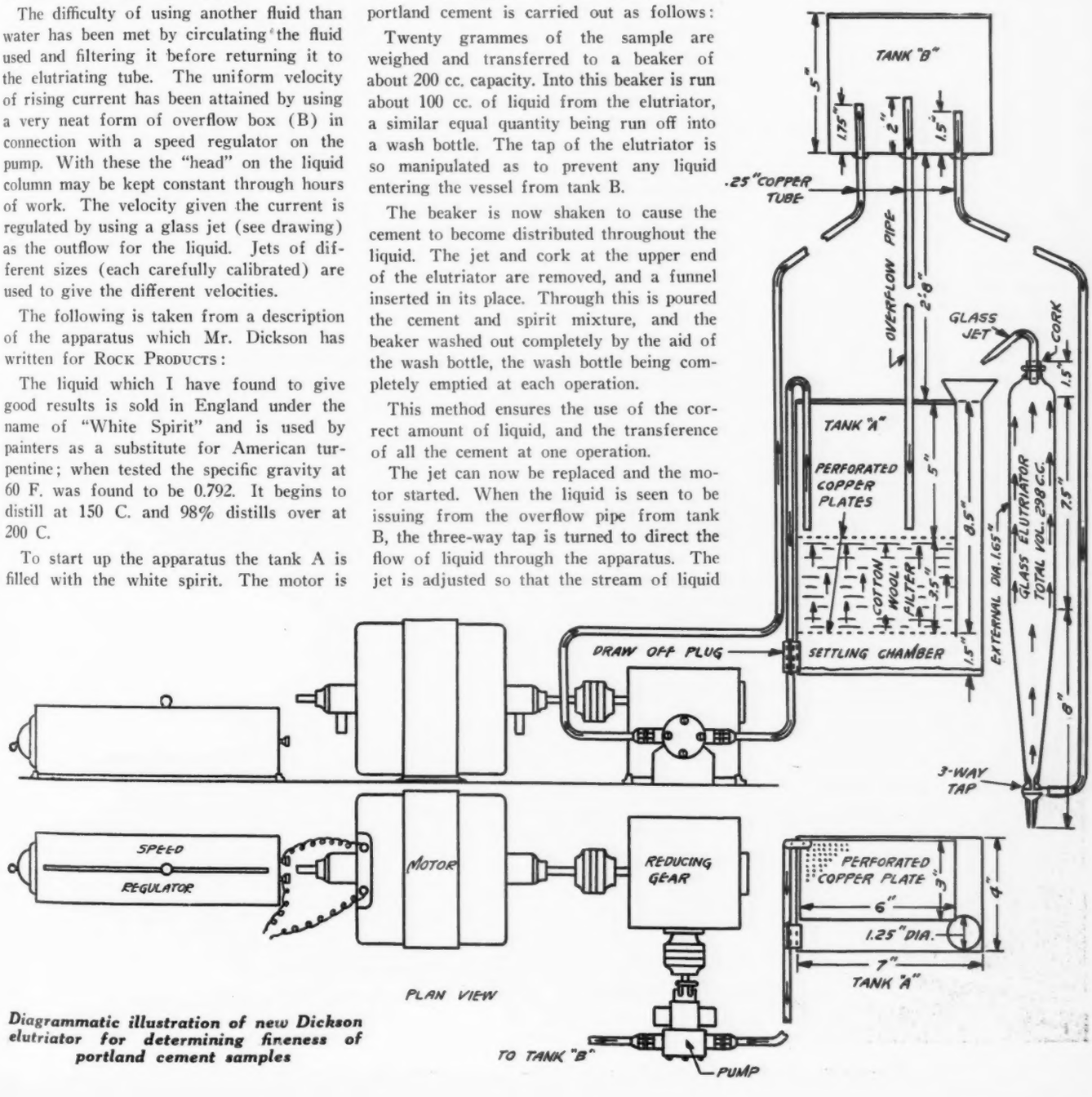
The beaker is now shaken to cause the cement to become distributed throughout the liquid. The jet and cork at the upper end of the elutriator are removed, and a funnel inserted in its place. Through this is poured the cement and spirit mixture, and the beaker washed out completely by the aid of the wash bottle, the wash bottle being completely emptied at each operation.

This method ensures the use of the correct amount of liquid, and the transference of all the cement at one operation.

The jet can now be replaced and the motor started. When the liquid is seen to be issuing from the overflow pipe from tank B, the three-way tap is turned to direct the flow of liquid through the apparatus. The jet is adjusted so that the stream of liquid and "flour" is directed down the funnel attached to tank A.

The flow is allowed to continue until no particles can be seen passing away from that portion of the elutriator immediately below the jet.

At the end of the test the three-way tap is closed and the "core" allowed to collect. It is not necessary to shut down the motor as it merely circulates the liquid. When the core has settled, this with about 100 cc. of spirit, are run into the beaker originally used. The core is allowed to settle and the liquid decanted into the funnel of tank A. The wet core is now washed with methylated ether to remove the white spirit. It is then carefully dried and heated to remove all traces of spirit, and when cold transferred to a counterpoised watch glass and



Diagrammatic illustration of new Dickson elutriator for determining fineness of portland cement samples

weighed. The following figures have been obtained on two different types of cement:

RAPID HARDENING PORTLAND CEMENT

Speed	
1 mm. sec.	32.675% coarse residue
2 mm. sec.	18.625% coarse residue
3 mm. sec.	10.800% coarse residue
4 mm. sec.	7.575% coarse residue
Tensile test	613 lb. per sq. in.

ORDINARY PORTLAND

Speed	
1 mm. sec.	47.850% coarse residue
2 mm. sec.	35.675% coarse residue
3 mm. sec.	25.900% coarse residue
4 mm. sec.	21.000% coarse residue
Tensile test	407 lb. per sq. in.

7 days 3-1 standard sand.

A curious phenomenon was witnessed during the earlier experiments; it was found that the flour refused to separate from the core and remained as a cloud in the tapered parts of the elutriator, the liquid passing through the cloud and out at the jet, almost clear and free from flour.

I have been unable to account for this curious fact, but a remedy was effected by the addition of a small quantity of rosin to the spirit.

The Original American Oyster-Shell Cement Plant

THE airplane view of the plant of the Texas Portland Cement Co. shows the arrangement of buildings but unfortunately does not show one of the most distinctive features, the beauty of the grounds by which the plant is surrounded. The scale of the photograph is too small to show the flower beds and shrubs which in their number and variety make a scene of almost unequaled beauty, for industrial works surroundings, throughout the year. The plant is at Manchester, a suburb of Houston, Texas, where the climate is so mild that the parks and gardens are as beautiful at one time of the year as another.

This plant is notable because it was one of the earliest American plants to make cement of oyster shells. These are dredged in Galveston Bay, about 50 miles distant, and barged from the bay through the ship canal to the plant. The canal shows in the picture and extending over it from the plant is the steel structure that supports the traveling crane with clamshell bucket by which the barges are unloaded. The shells are stockpiled by this crane and recovered and sent to the raw-grind mills by the crane. Shells do not handle on belts so well as some other materials. The process employed does not vary materially from that of other cement mills, standard machinery, mostly of Smidth design, being used throughout. Oil is used in the kilns for fuel.

The company is a subsidiary of the International Cement Corp. and the plant is one of a number that are situated at or near a large center of population.

Texas Cement Production Shows Increase in 1926

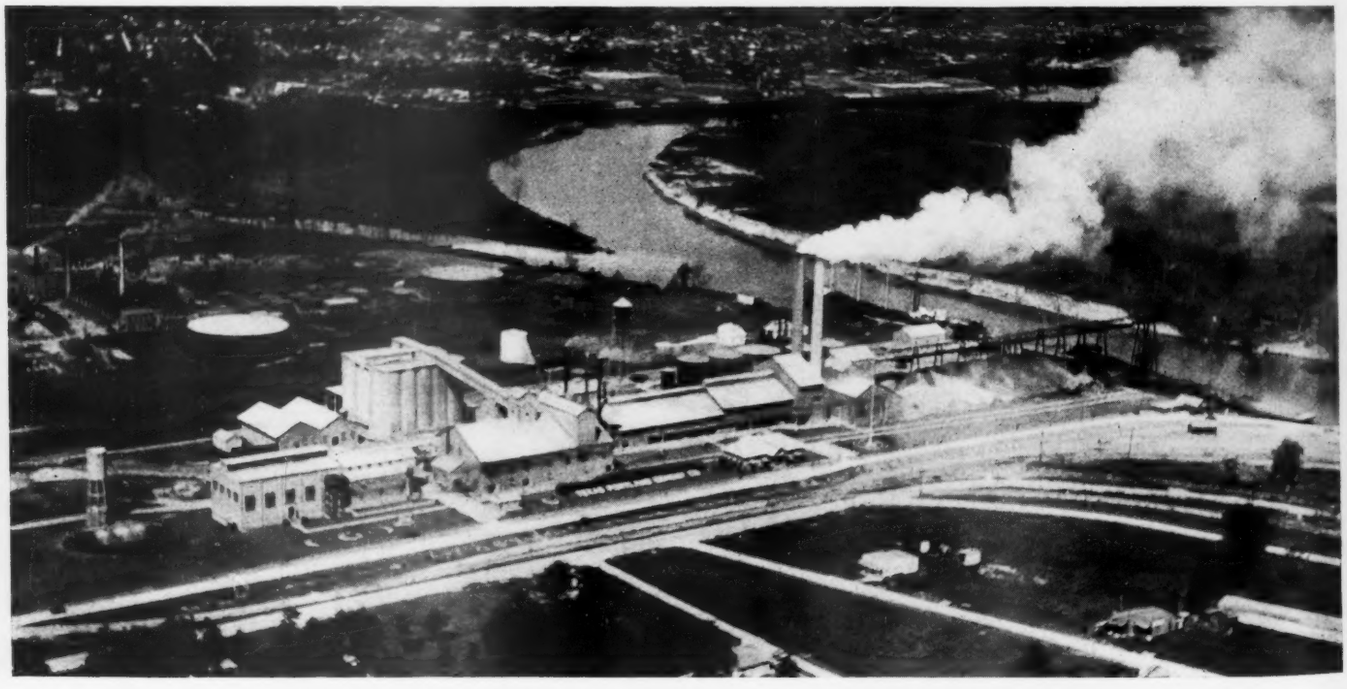
STATISTICS obtained by the Bureau of Economic Geology of the University of Texas in co-operation with the United States Bureau of Mines show that cement was produced in Texas during 1926 to the amount of 5,007,374 bbl. This production was from six plants located in San Antonio, El Paso, Dallas, Houston and Fort Worth. The amount sold was somewhat larger than that produced, the sales being 5,042,359 bbl., thus reducing somewhat the stock on hand at the close of the year. The value of cement produced in 1926 was $9,522,701 or an average per barrel sale value of $1.89, according to Dr. E. H. Sellards, acting director of the Bureau of Economic Geology. Both production and sale of cement materially increased during 1926 over 1925, the production for 1925 being 4,858,212 bbl., and the sales being 4,735,521 bbl., valued at $8,729,046.

Building activities in the larger cities as well as the smaller towns of the state for the first nine months of 1927 are reported to be greater than during the corresponding period of 1926, and it is expected that cement production and sale for the current year will considerably exceed that of last year.

Unusual Portland Cement Concrete

"PORTLAND Cement Concrete of Unusual Character" is the title of an excellent treatise published by the Kansas City Testing Laboratory and issued as Bulletin No. 23. Its author is Roy Cross, the laboratory manager and one of its owners.

He points out that concrete has sometimes to be made for special purposes such as waterproofing, prevention of freezing during hardening, quick hardening, improved workability, light weight, insulation against heat and cold (fireproofing and for refrigeration), sound proofing and the prevention of parasitic growths. In general, these purposes demand either integral mixture of a special agent, surface treatment or the use of a special aggregate, and the bulletin covers these materials and their uses quite thoroughly. Much of what is said in the bulletin may be found here and there in the literature of concrete, but this is the first publication the writer has noted in which the various methods for making special concrete are brought together to make a compact treatise—well written and illustrated.



Aeroplane view of the plant of the Texas Portland Cement Co., near Houston, Tex.

Doubling Signal Mountain Plant's Cement Output

Changes and Improvements at a Three-Year-Old Plant

THE plant of the Signal Mountain Portland Cement Co. of Chattanooga, Tenn., was built about three years ago. Since that time it has been enlarged and improved until its output is almost double what it was when the plant was first operated. The present production capacity is 4500 bbl. per day.

This is one of the American plants which makes what continental Europeans would class as a high-test cement, yet here it is sold as ordinary, or standard, portland cement. While the notes for this article were being made the writer was given the privilege of examining the laboratory records. The average three-day strength for the preceding month was shown to be 237 lb. and the seven-day strengths noted ran around 325 lb., while the 28-day strengths were from 425 to 450 lb.

From this early hardening quality one might predict a high lime content and fine grinding. The CaO content of the finished material runs around 64%+ and the grinding is finer perhaps than usual, the laboratory records showing a number of fineness tests of 88%, or near it, through 200-mesh.

Raw Materials Near Plant

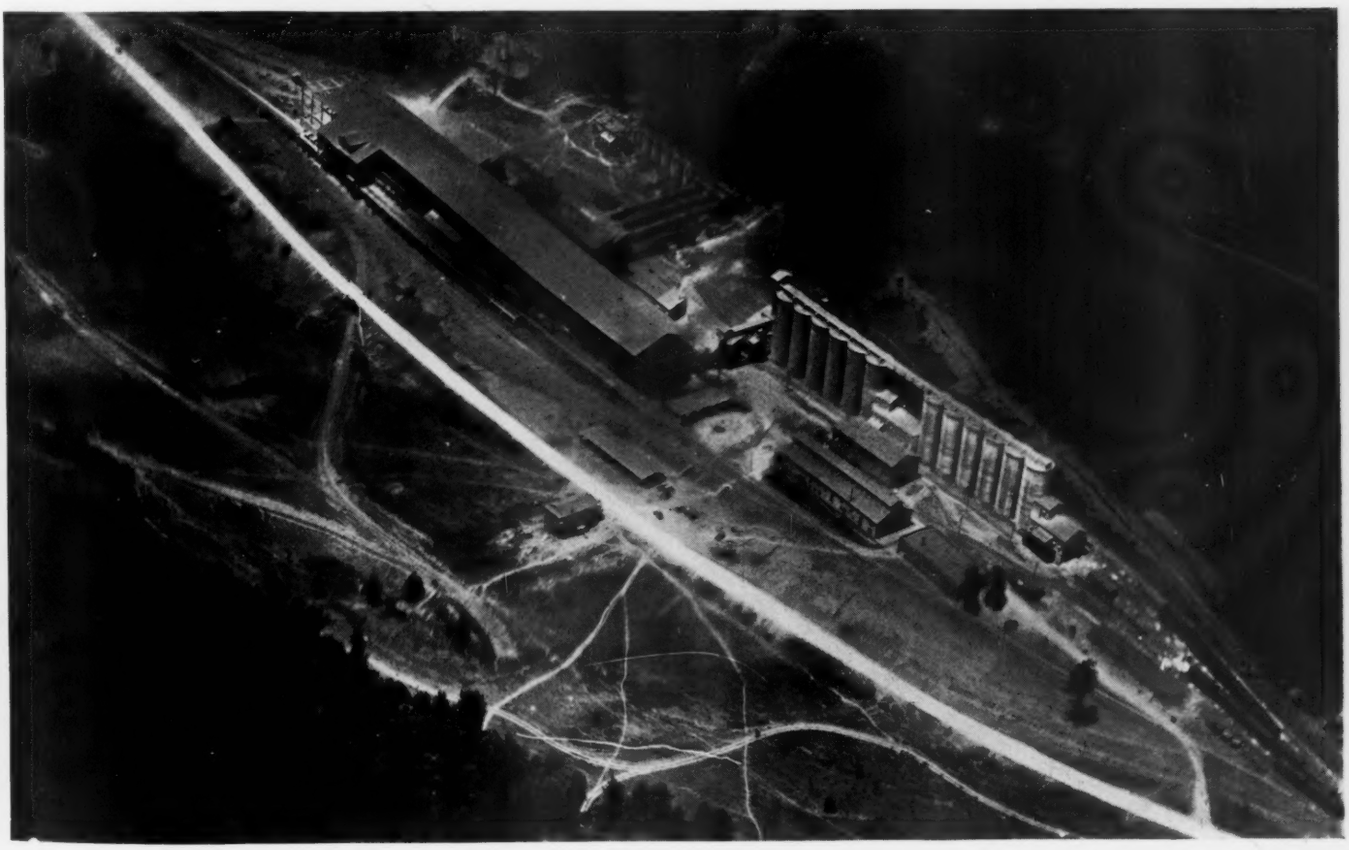
The raw materials used are lime-rock and clay and both are near the plant. The lime-rock is quarried from a face 115 ft. high, which is very solid and regular in appearance. It must break well, however, for the holes are set 16-ft. apart and given 35-ft. burden. Two Sanderson-Cyclone drills are used and the holes are charged with gelatine at the bottom and 40% powder above.

The broken rock is loaded by two steam shovels both of Bucyrus make. One of these, a 50-B model, is a recent addition to the equipment. Steam dinkeys, one Baldwin and one Vulcan, bring in the rock to the plant. The quarry cars were made by the Easton Car and Construction Co. Clay is dug from a pit near by and sent to the plant on flat cars.

The rock as quarried contains on the average 50.39% CaO, 5.5% SiO_2 and 2.2% Al_2O_3 plus Fe_2O_3 with 2.37% of MgO. The clay contains 63.13% S_2O_3, 17.60% Al_2O_3, 7.6% Fe_2O_3, 1.14% CaO and 1.12% MgO.

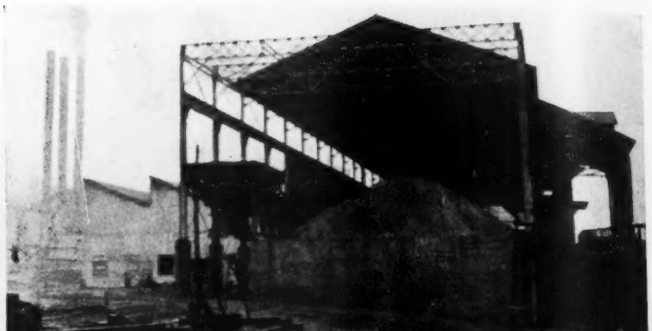
At the plant the rock is dumped to a 42-in. Allis-Chalmers Gates gyratory. From this it goes to a 48-in. pan conveyor and is elevated to the bin of a No. 6 Williams "Jumbo" hammer mill. From this it is discharged to the long storage bin under the craneway.

This bin and craneway is the very heart of the plant, as all the machinery is designed to be served from it. The storage is 800 ft. long and two 6½-ton Shepherd cranes can reach every part of it. In addition to the convenience and certainty of handling materials by cranes, the system provides an unusual storage capacity. For rock there is a space 225x50 ft. (the width of the storage bin) holding 19,000 tons. For clay there is 62.5x80 ft. holding 6000 tons. The coal storage, which comes next to the clay storage, will hold 8000 tons and the gypsum storage 1100 tons. Beyond these is the



View of Signal Mountain Portland Cement Co.'s mill at Chattanooga, Tenn., after addition of new equipment which increased the capacity to 4000 bbl. per day

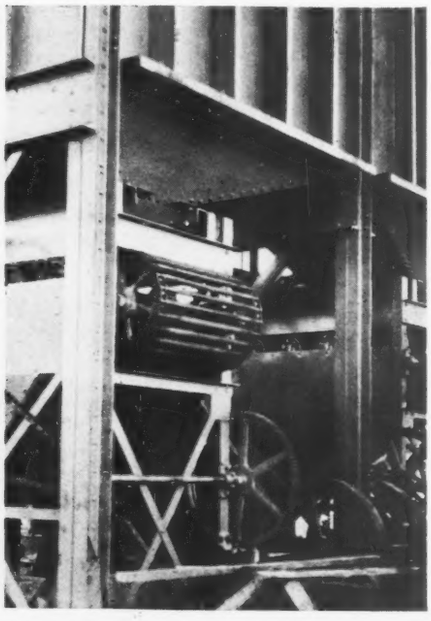
Train of quarry cars in the quarry



Clay storage end of the 800-ft. craneway

clinker storage which will hold 185,000 bbl. or something more than a full months' output of the kilns.

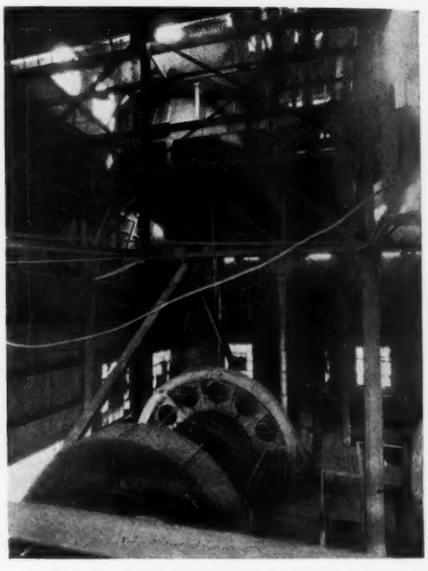
The crane lifts the raw material to the bins of the four raw-grind mills, which are Allis-Chalmers compebs 7x26 ft., lined with chrome steel in the first compartment and chilled iron in the remaining compartments. Each is driven by an Allis-Chalmers synchronous motor with a Cutler-Hammer magnetic clutch. The grinding is wet and the slurry is pumped by a 4-in. Morris centrifugal pump to the nine slurry tanks. Three of these are a recent addition to the plant and they are 25 ft. in diameter and 32 ft. deep. There are two others of the same size used alternately as correction tanks and kiln tanks and four others which are 20 ft. in diameter and 25 ft. deep.



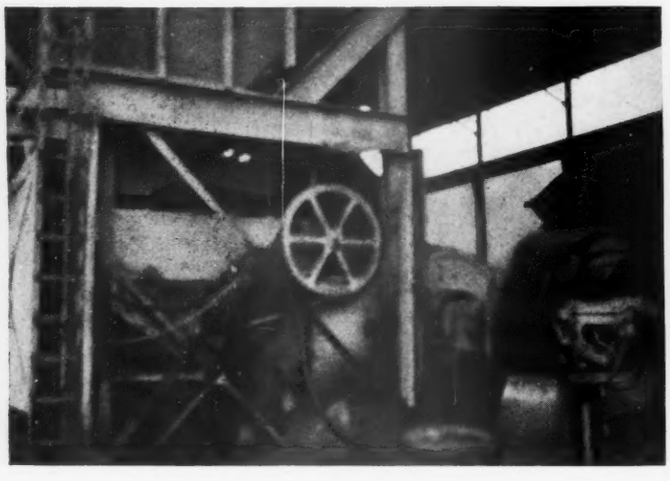
Feeder for hammer-mill crusher

All these tanks are agitated mechanically and by air. The mechanical agitators are stirring mechanisms designed by the builders of the plant and the air agitators are simple jets which are employed intermittently. Air is always used whenever a tank is filled and whenever a tank is being pumped to the correction tanks. The system of correction is to pump from one, two or even more tanks to get the required mix, sampling the stream as the pumping goes on with space left for final correction if this is necessary. By using each of two tanks alternately a corrected tank is always ready to be fed to the kilns as soon as its mate has been emptied. The Ferris wheel type of feeder is used to supply the kilns with slurry.

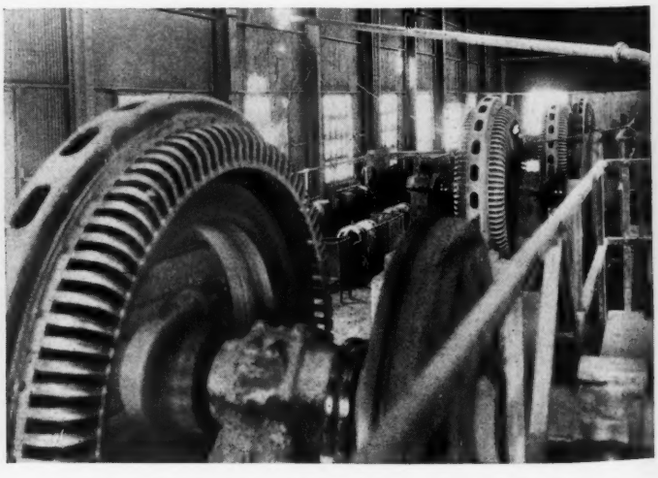
The kilns, which were made by Allis-Chalmers, are 175 ft. long and 11 ft. in diameter. They are fired with powdered coal and the burner is one which was developed at the plant by the Cowham Engineering Co. Air is supplied by an American Blower fan and direct connected motor. The feature of the new burner is a provision for



Finish grinding mill and air separator in closed circuit



Secondary crusher (hammer mill) and its motor drive

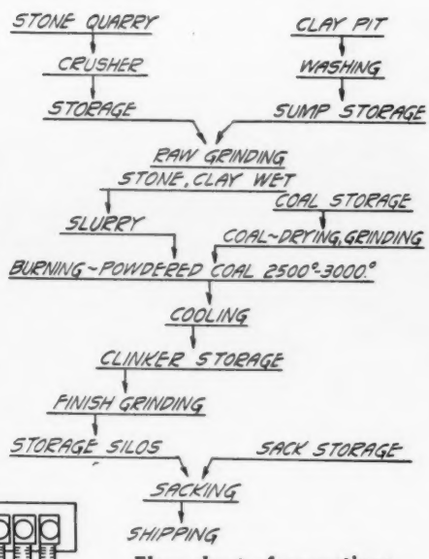


Synchronous motors with magnetic clutches driving the raw-grind mills

the escape of contained air so that the powdered coal will not flow like water and flood the burner.

Clinker Storage and Grinding

There is a very large space for storing clinker, as has been previously noted, and advantage is taken of this to insure a uniform product of the same age to be fed to the finish grind mills. The clinker as it comes from the kilns is stored at one end of the space by the crane which beds it as it builds the pile. Clinker for grinding is taken from the bottom of the pile at the other end. As the stored pile grows, the pile which is fed to the mills decreases at the same rate so that a space of the same size is always left between the two. And as the clinker to be ground is always taken from the bottom of the pile, it includes everything in the pile from the bottom to the top. This is something like the bedding method used for many years in smelters, whereby various kinds of ore and flux could all be bedded and yet be fed in uniform charges to the furnaces.

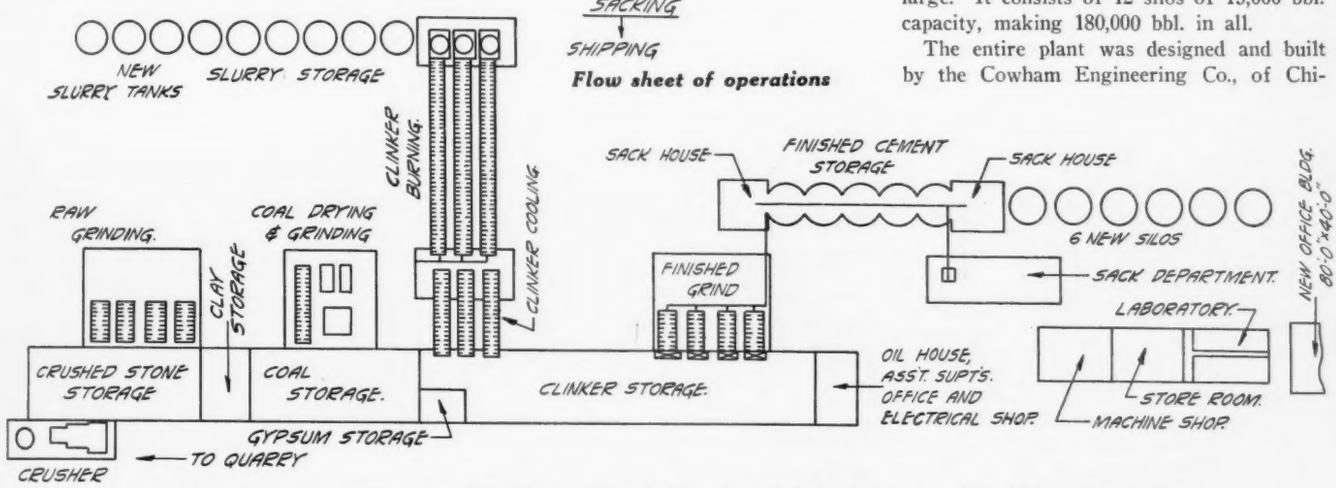


Flow sheet of operations

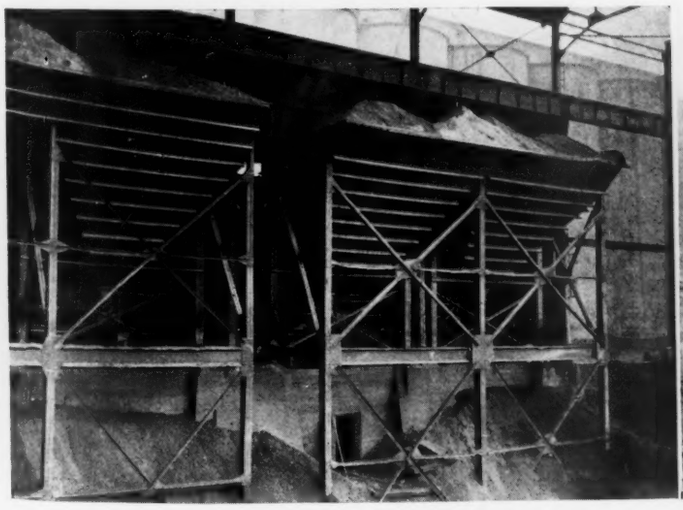
In the finish grind plant experiments have been going on for over a year with a Sturtevant air separator which is in closed circuit with one of the compeb mills. The results are not wholly ready for publication, but it may be said that they show an increased tonnage ground to the same fineness. However, some further explanation is required. Fineness in cement is ordinarily measured by the amount remaining on 200-mesh. As screens below 200-mesh are hardly practical in everyday testing, no account of the fineness below 200-mesh is ordinarily made. Grinding to 85% through 200-mesh, experiments have shown that the air separator gives a considerable increase in tonnage, but the portion *through* 200-mesh is not ground so fine as it is without the air separator. To get the same effectiveness in grinding with the air separator, the clinker must be ground to 88% through 200-mesh and that is the practice at this plant. Some experiments have shown as much as 25% increase in tonnage under those conditions, others not so good an increase. As the power required for air reparation is only 37½-hp., a comparatively small increase in tonnage would justify the use of air separators in the power saved.

The storage at this plant is unusually large. It consists of 12 silos of 15,000 bbl. capacity, making 180,000 bbl. in all.

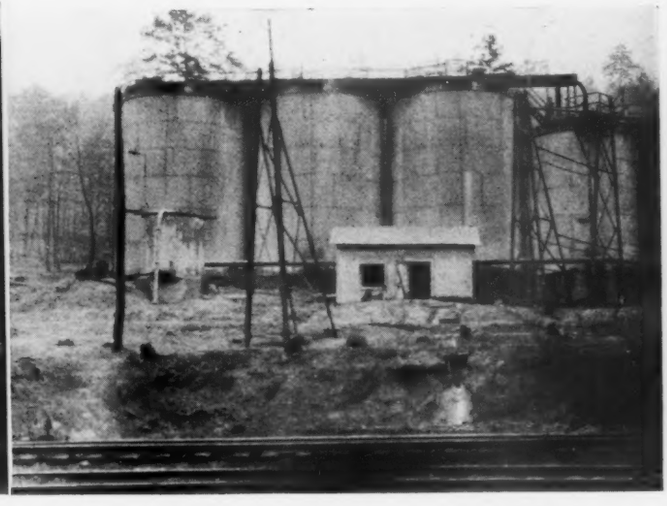
The entire plant was designed and built by the Cowham Engineering Co., of Chicago, which has built a number of plants throughout the United States. The president of the company is John L. Senior of the Cowham Engineering Co., and J. L. Caldwell and F. P. Butler are vice-presidents. The secretary and assistant general manager is R. R. Caskey, who is in charge of operations at the plant, and R. S. Conner is superintendent. Paul R. Beck is plant chemist. The general offices are at the plant.



General layout of equipment and buildings, Signal Mountain Portland Cement Co., Chattanooga, Tenn.



Hopper for feeding clinker to finish grinding mills



Three new slurry tanks recently built

Locklath—A Gypsum Lath That Is Different

The Plastoid Products, Incorporated, Los Angeles, Calif., Pioneers a New Field

By Alva Warren Tyler
Consulting Engineer, Los Angeles, Calif.

THE Plastoid Products, Inc., of Los Angeles, Calif., successful manufacturers of gypsum wallboard and other gypsum products, was organized in 1918 by Orville L. Routt, who has since been its president. It has been almost entirely due to the untiring efforts of Mr. Routt that the company has reached its present enviable position, not only operating a successful business, but manufacturing a product that is known throughout the United States and recognized as being so unique in design and construction that it is alone in its field and almost without competition in the territory which the present capacity of the plant is able to supply.

Mr. Routt is primarily a lumber man, having been for years connected with the Pioneer Lumber Co. of Hollywood, Cailf., and it was through contact with this trade he came to recognize the importance of gypsum wallboard and plaster lath in the building materials field. Not being a gypsum man, Mr. Routt spent several years experimeeting and acquainting himself with the peculiarities of this product, giving particular attention to plaster board and wallboard and noting their points of strength and weakness. Being a man of vision and having a creative mind, he finally produced

Orville L. Routt, inventor of Locklath

what is now known to the trade as "Locklath," a plaster lath or plaster board so original in character that, while being constructed of gypsum plaster and paper, it bears little resemblance to the ordinary gypsum product known as plaster board.

There are two outstanding weaknesses in the ordinary plain faced plaster board, having the usual untreated paper covering—lack of strength when subjected to moisture, and the failure of the bond between the board and plastering when subjected to high temperatures such as would be experienced in case of fire, this failure being due to the burning of the paper which is the sole bonding agent between the board and the plastering.

Both of these weaknesses were successfully overcome in the manufacture of Locklath. In order to overcome the first weakness, penetration of moisture was eliminated by waterproofing the paper covering surfaces of the board by saturating one side of each sheet with asphalt. The side saturated is the outside of the back sheet (the one lying next to the studding when in place) and the inside of the face paper. The practical reason for this method of saturating the sheets is to obtain a proper bond between the plain back paper of the board and its plaster core, the bond being taken care of on the face of the board by dovetailed grooves forming a mechanical interlock, besides the natural adhesion between the asphalt and plaster core, undoubtedly increased by the heat generated in the

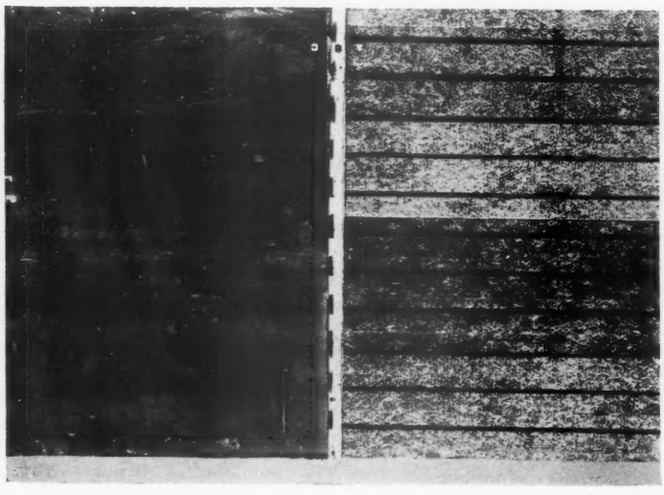


Fig. 1. View showing front, cross-section and back of Locklath (Photos from Underwriters' Laboratory Report, Ret. No. 1954)

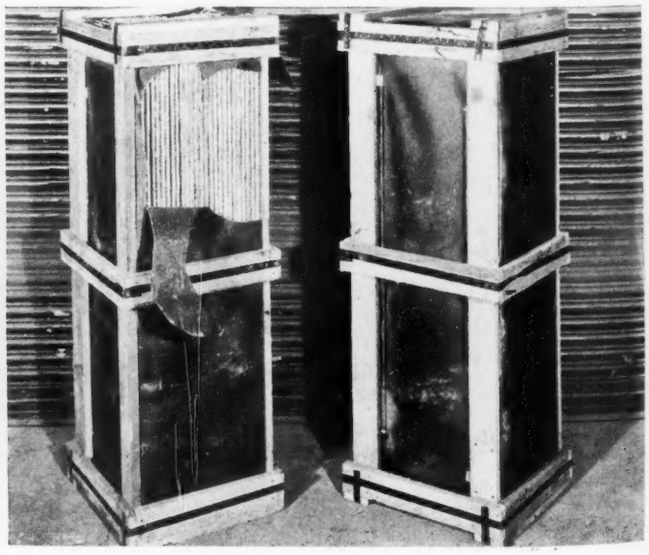


Fig. 3. Locklath crated for shipment

core during its setting period, somewhat softening the asphalt and allowing a more intimate contact. This leaves the untreated face of the sheet exposed to receive the plastering with which it bonds in the normal way. Additional bond is also obtained for the plaster by the dovetailed grooves referred to above. Figs. 1 and 2 clearly illustrate a cross-section of Locklath, showing this grooving which particularly differentiates it from the ordinary board and overcomes the second weakness, that of bond disintegration when subjected to high temperatures as in the case of fires.

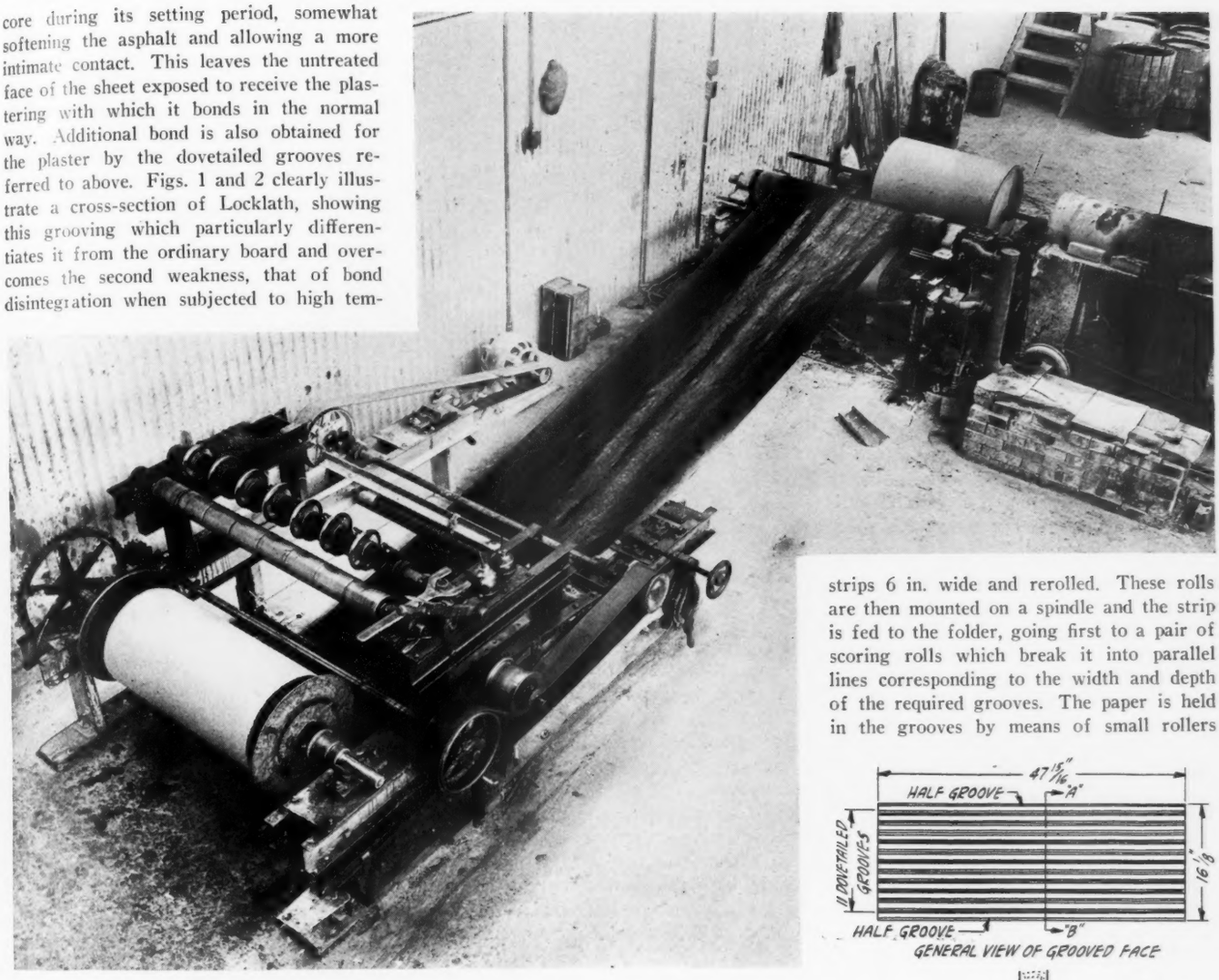


Fig. 4. Treating paper with hot asphalt solution. View also shows the combination re-winder and slitting machine

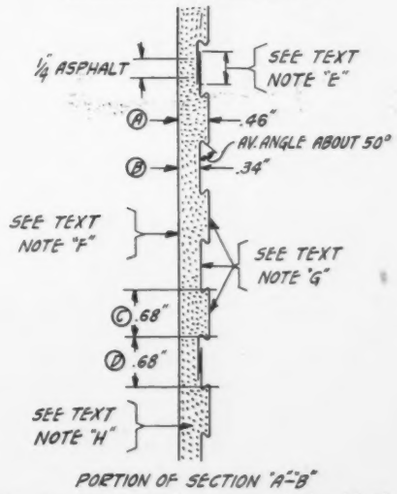
The idea of bonding two separate materials or objects together by dovetailing is, of course, an old one and may or may not have been thought of in connection with a plaster board, but if so the idea was evidently abandoned as an impractical one, because it would seem that the placing of such grooving in the face of a plastic material which eventually sets (and having a cover sheet) would be almost an impossibility. However, one of the first inventions of Mr. Routt, and the one that paved the way for Locklath success was a machine for folding the face paper of the board so as to form longitudinal grooves in the finished product which would positively interlock with the final wall plastering.

Folding the Paper

This machine naturally presented a real problem that took long hours of study and experimentation before it was finally developed into the comparatively simple device it is today. Fundamentally the machine consists of a flat steel base about 6 in. wide by 4 ft. long, having grooves running lengthwise to correspond with those required in the finished plaster board. At the beginning the grooves are comparatively wide and shallow, gradually converging and deepening until they attain the cross-section of the grooves in the finished board. The grooves then become shallower again as they are brought closer together and the upper edges are swung inwardly until they become practically horizontal, forming in effect a longitudinal slot open at its top center. This base is mounted on a steel framework at a convenient height to be easily handled by the operator.

The paper to be folded is made up from large rolls cut in a slitting machine into strips 6 in. wide and rerolled. These rolls are then mounted on a spindle and the strip is fed to the folder, going first to a pair of scoring rolls which break it into parallel lines corresponding to the width and depth of the required grooves. The paper is held in the grooves by means of small rollers

GENERAL VIEW OF GROOVED FACE



PORTION OF SECTION "A"-"B"

Fig. 2. Cross-section through Locklath

Note E. The edges of adjacent strips of corrugated paper felt make ½-in. lap joints at the bottom of every third groove. The laps are cemented together by a ribbon of asphalt about ¼ in. wide.

Note F. Paper felt, saturated with asphalt on one side, fibrous and absorbent on the other side, covers the core on the flat face of Locklath. The absorbent fibrous side of the paper is in contact and forms a bond with the gypsum core; the asphalt or waterproofed side is exposed, intended to protect the core from moisture. The dry paper felt is .022 to .024 in. thick and weighs 60 lb. before, and 80 lb. per 1000 sq. ft. after one side is saturated with asphalt.

Note G. Paper felt, saturated with asphalt on one side, fibrous and absorbent on the other side, covers the core on the grooved face of Locklath. The absorbent fibrous side of the paper is exposed to form a slight suction surface to bond with plaster; the asphalt or waterproofed side is in contact with the gypsum core, intended to protect it from moisture from the wet plaster. The dry paper felt is .015 to .017 in. thick and weighs 44 lb. before, and about 60 lb. per 1000 sq. ft. after one side is saturated with asphalt.

Note H. The core consists of a mixture of sawdust and of hydrated gypsum mixed in the proportion of 12% by weight of sawdust to 88% of dry calcined gypsum. The gypsum used is not less than 92% pure calcium sulphate—$CaSO_4\ 2H_2O$—when hydrated.

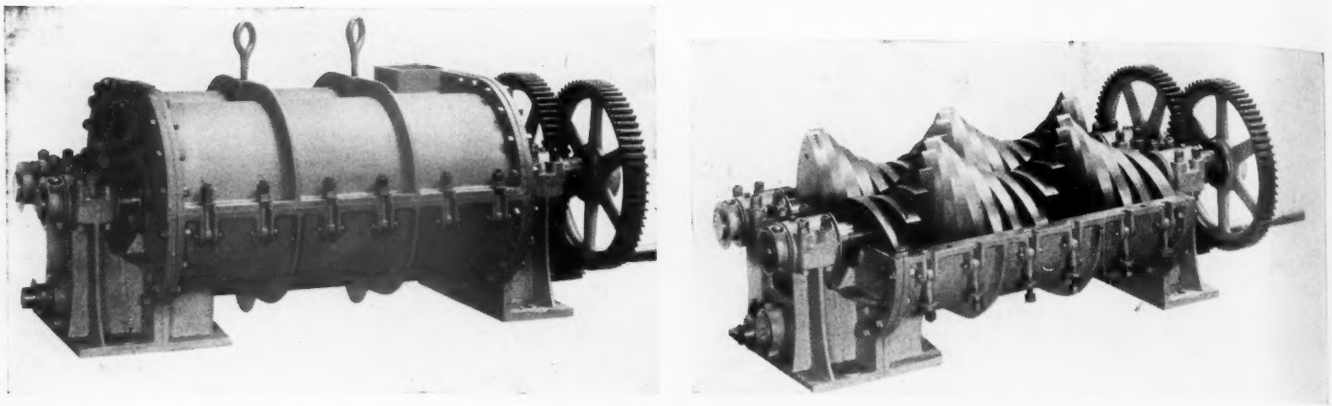


Fig. 5. Two views of gypsum-stucco mix devised by Mr. Routt—with and without casing

until it is automatically retained by the overlapping edges. When the paper has been folded as far as practicable, the base with its grooves is discontinued and the paper is delivered to a pair of ironing rolls, which iron the folds together into almost a flat sheet or strip which is about 4½ in. wide. It is then rewound. Four of these rewound strips are next placed side by side on horizontal parallel spindles staggered so that the edges of the strips overlap. The strips are run off and their edges cemented together with hot asphalt, making a strip of sufficient width for the required width of board (16 in.). This is again rewound into the finished roll.

Locklath Produced on Standard Wallboard Machine

In producing Locklath a standard wallboard machine is used, that is, a machine for producing board 48 in. wide. This enables the manufacturer to produce either Locklath or ordinary wallboard without any appreciable amount of extra equipment. When Locklath is being run three of the finished rolls of specially folded paper are mounted side by side on staggered parallel spindles and run off as a single sheet, which forms the bottom paper of the board. As it is drawn from the roll it runs over another patented device consisting of a series of fingers which spread and shape the folds to form the dovetailed grooves of the board. The paper is supported in this position until it receives the plaster after which the grooves are self-supporting. The top paper, which is the back paper of the finished board, consists of a single plain sheet 48 in. wide having been previously treated on the outside face with asphalt.

It will be seen that through the use of a standard wallboard machine the operation of producing either wallboard or Locklath is practically identical, since the full 48 in. width of board is produced in either case,

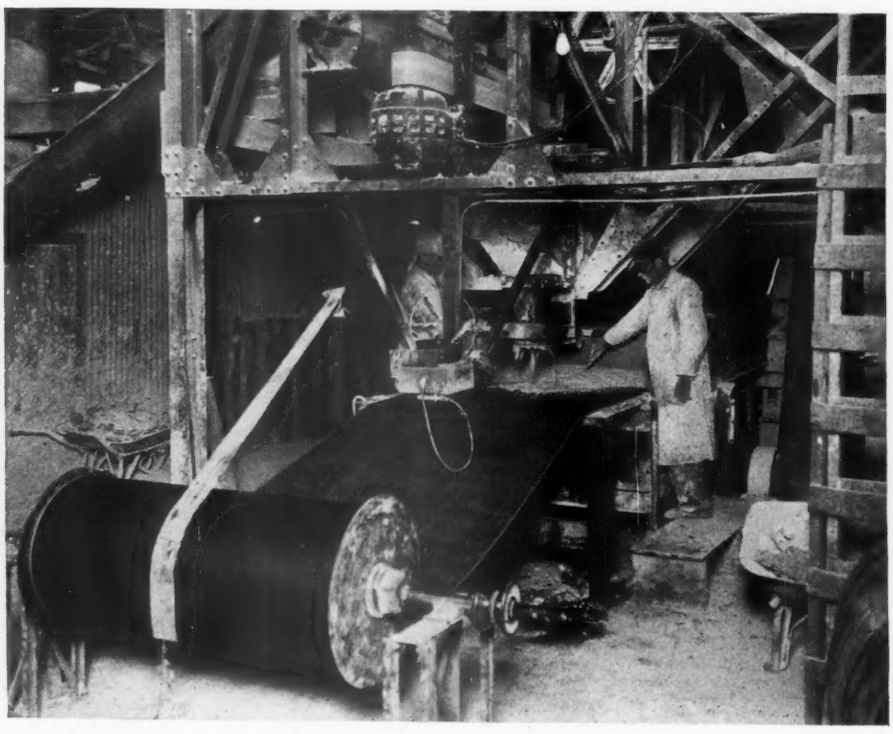


Fig. 7. Continuous type wet mixer recently installed at new wallboard plant

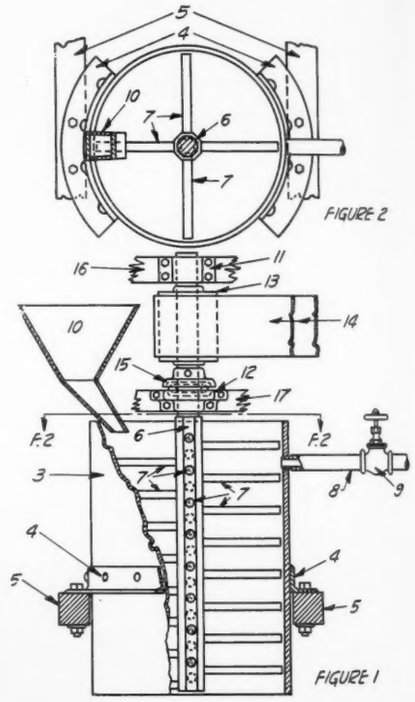


Fig. 6. Details of new stucco mixer

the Locklath being reduced to the 16 in. dimension by means of high-speed circular saws cutting it longitudinally after the plaster is fully set. Another saw operating cross-wise of the board reduces it to any desired length, this length being positively controlled by means of an adjustable tripper.

Size of Locklath

The size of Locklath remains as it was originally established, 16x48 in., and it is interesting to note that most of the western manufacturers and a large eastern manufacturer have recently adopted this size as their standard for plaster board. Locklath crated for shipment is shown in Fig. 3.

Waterproofing Locklath Cover Sheets

The process of asphalting one side of the paper for either Locklath or wallboard is a simple one, being accomplished by means of a large roll dipping into a hot asphalt solution and then being transferred to the paper, the principle being similar to that of

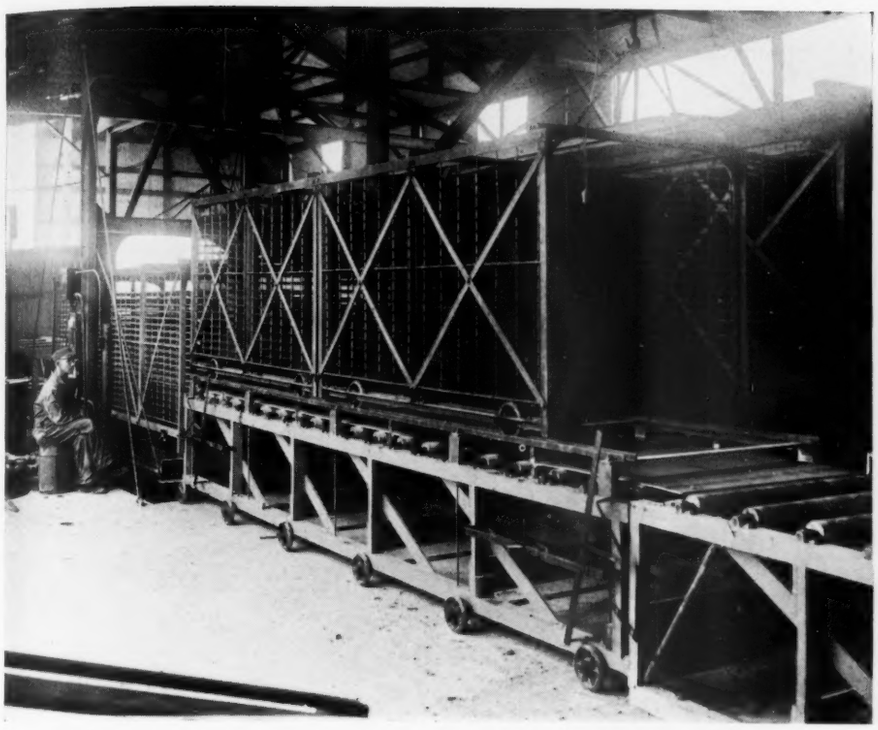


Fig. 8. Special kiln cars, showing semi-automatic take-off from board machine

a printing roll (see Fig. 4). The waterproofing of wallboard or plaster board by means of a partially saturated cover sheet was the second of Mr. Routt's important inventions.

Mixing Plaster for Locklath

The third problem confronting the manufacturers of Locklath was that of mixing the plaster with water to form the necessary plastic mixture, a problem which has occupied the attention of all wallboard manufacturers for many years. They did not observe, however, the usual procedure of investigating precedents in this matter, in fact the large manufacturers of plaster board were too far away to admit of such investigation and on account of the secrecy attached to manufacturing methods at that time, information would have been hard to obtain even though they were close at hand. Therefore, since they had become somewhat accustomed to solving their own problems by this time, they set out to produce their own mixing device. That they succeeded is quite well established by the fact that a number of eastern producers later adopted this mixer in their own plants, bringing out quite clearly the point that old established concerns in any given line of manufacture are not necessarily in possession of the most efficient methods of operation, and that very often most important improvements are found outside of their organizations. The mixed referred to is shown in Fig. 5.

It is of the continuous type and very compact and simple. However, in spite of the fact that Mr. Routt and his engineers had devised a mixer recognized and accepted as an improvement over the older methods in use, the progressive spirit of the institution is shown in their desire for something still better. The machine they had produced was compact and simple in its operation and construction, yet it was expensive to build. They felt that this mixing operation should be accomplished by something still more simple and inexpensive. The result of this feeling is expressed in a mixer illustrated in Fig. 6. This is a copy of the patent drawing. The machine is shown in actual operation in Fig. 7.

The vertical motor shown in the upper part of the picture is driving the mixer at high speed and the illustration shows quite clearly the small size of the mixer itself, which is directly over the center of the belt between the two attendants. Its size and simplicity when compared to the usual type of wallboard mixer is almost unbelievable,

Fig. 9. New wall-board and Locklath plant of the Plastoid Products, Inc., Los Angeles, Calif.

Fig. 10. Panel prepared for fire test

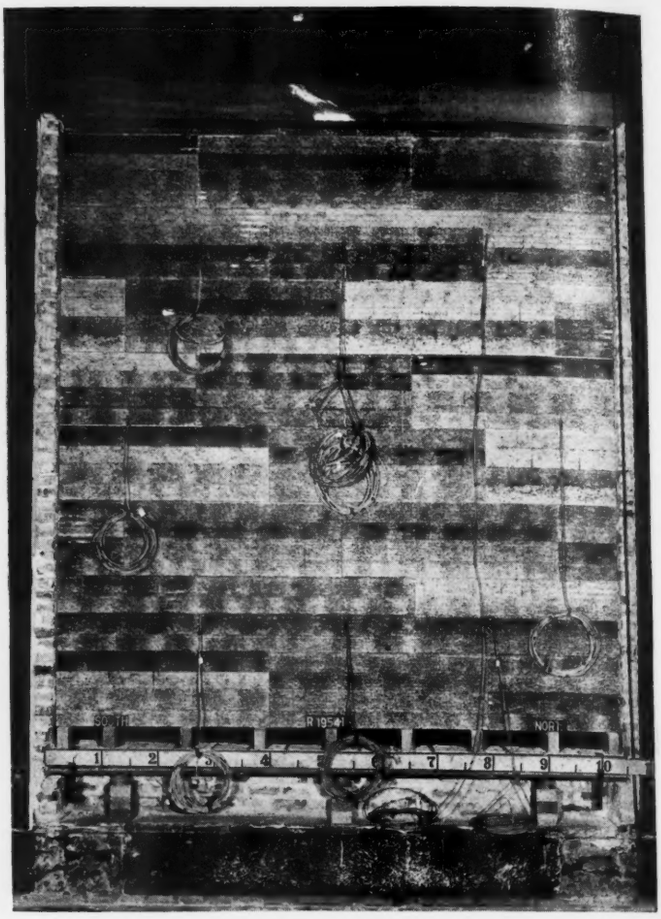


Fig. 11. Locklath applied on both sides

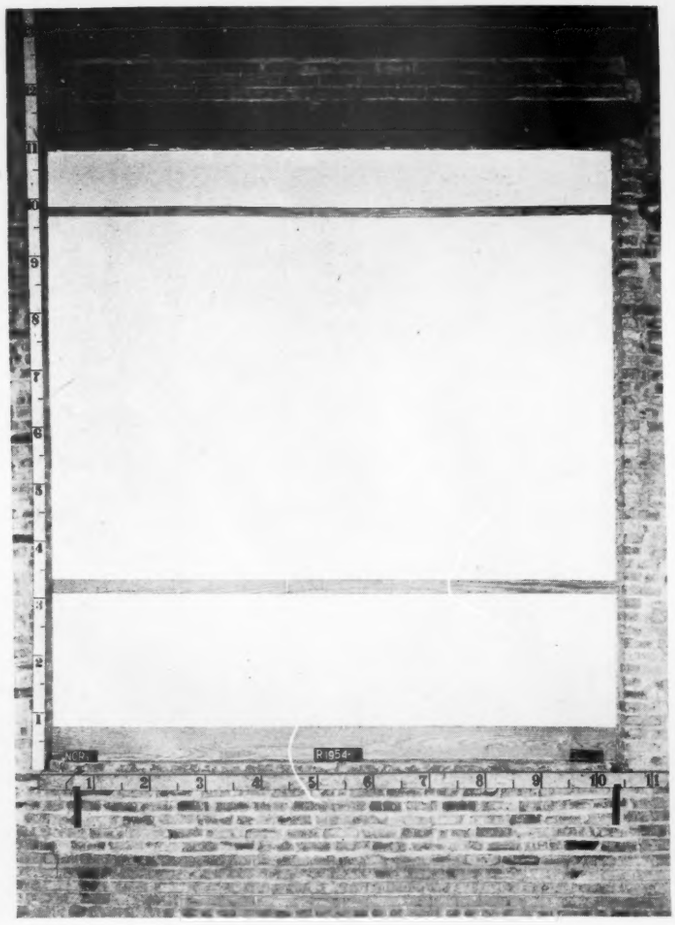


Fig. 12. Two coats of gypsum plaster, both sides

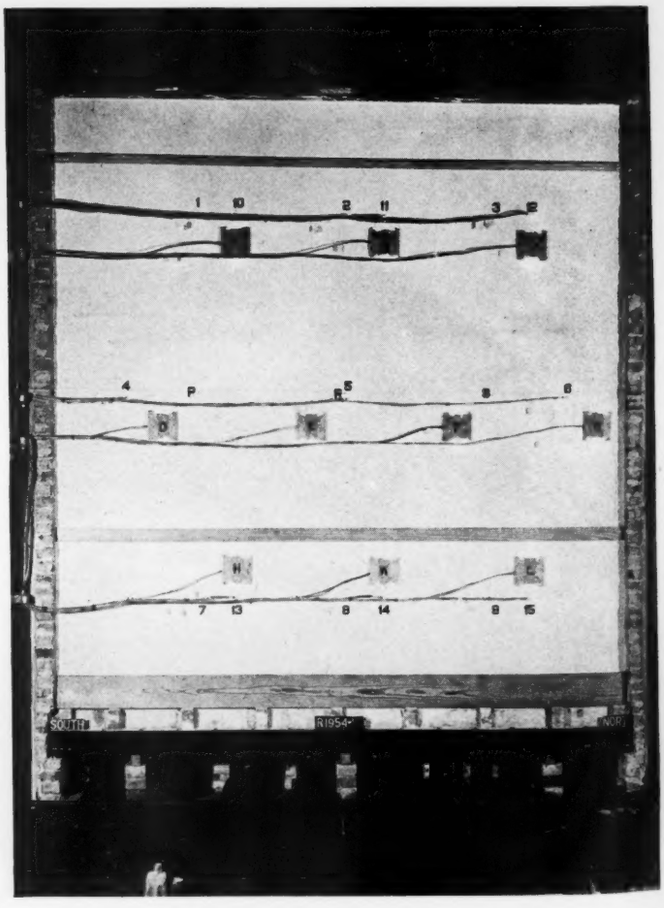


Fig. 13. Exposed side showing thermo-couples

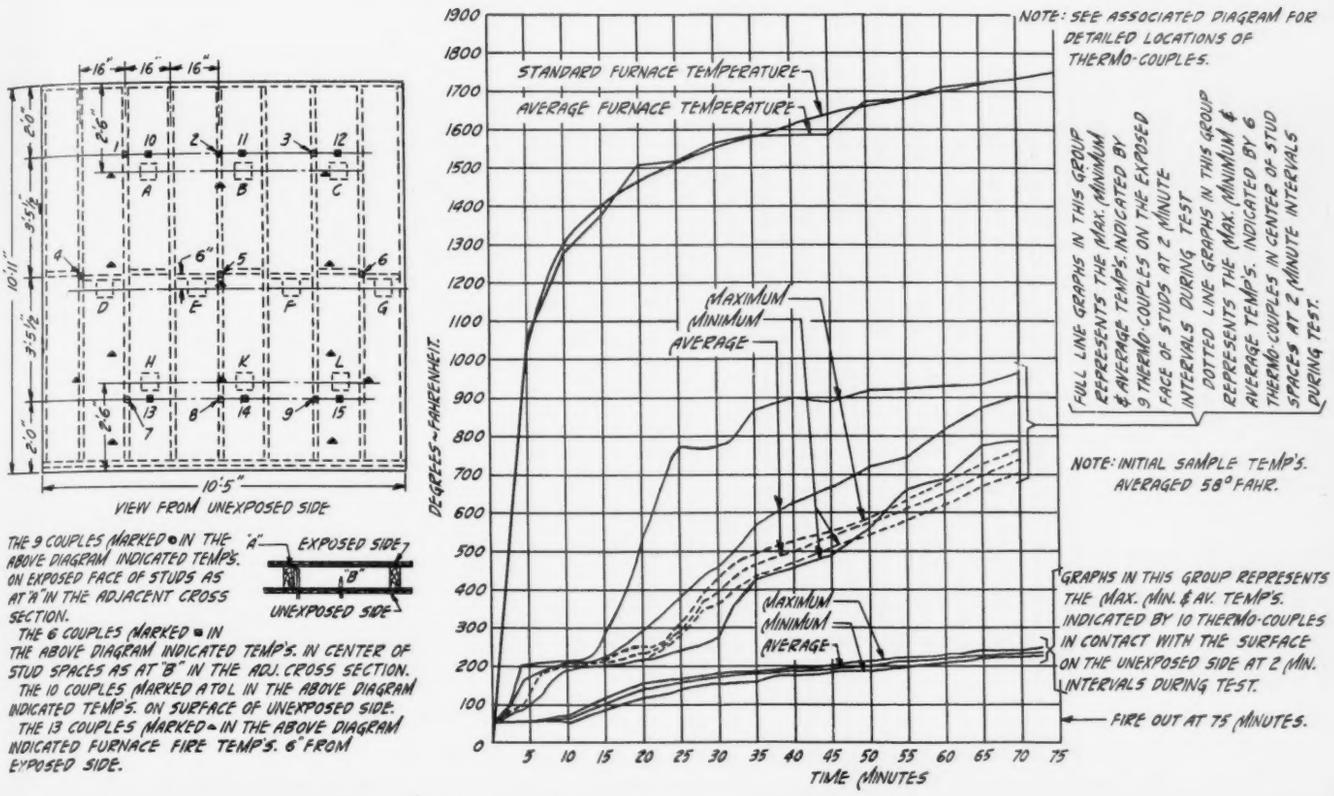

16" 16" 16"
2'0"
2'6"
9'5½"
9'5½"
2'6"
2'0"
10'11"
10'5"
VIEW FROM UNEXPOSED SIDE
THE 9 COUPLES MARKED ● IN THE ABOVE DIAGRAM INDICATED TEMP'S. ON EXPOSED FACE OF STUDS AS AT "A" IN THE ADJACENT CROSS SECTION.
THE 6 COUPLES MARKED ● IN THE ABOVE DIAGRAM INDICATED TEMP'S. IN CENTER OF STUD SPACES AS AT "B" IN THE ADJ. CROSS SECTION.
THE 10 COUPLES MARKED A TO L IN THE ABOVE DIAGRAM INDICATED TEMP'S. ON SURFACE OF UNEXPOSED SIDE.
THE 13 COUPLES MARKED ▲ IN THE ABOVE DIAGRAM INDICATED FURNACE FIRE TEMP'S. 6" FROM EXPOSED SIDE.
"A"
EXPOSED SIDE
"B"
UNEXPOSED SIDE
DEGREES - FAHRENHEIT
TIME (MINUTES)
STANDARD FURNACE TEMPERATURE
AVERAGE FURNACE TEMPERATURE
MAXIMUM
MINIMUM
AVERAGE
MAXIMUM
MINIMUM
AVERAGE
NOTE: SEE ASSOCIATED DIAGRAM FOR DETAILED LOCATIONS OF THERMO-COUPLES.
FULL LINE GRAPHS IN THIS GROUP REPRESENTS THE MAX. MINIMUM & AVERAGE TEMP'S. INDICATED BY 9 THERMO-COUPLES ON THE EXPOSED FACE OF STUDS AT 2 MINUTE INTERVALS DURING TEST.
DOTTED LINE GRAPHS IN THIS GROUP REPRESENTS THE MAX. MINIMUM & AVERAGE TEMP'S. INDICATED BY 6 THERMO-COUPLES IN CENTER OF STUD SPACES AT 2 MINUTE INTERVALS DURING TEST.
NOTE: INITIAL SAMPLE TEMP'S. AVERAGED 58° FAHR.
GRAPHS IN THIS GROUP REPRESENTS THE MAX. MIN. & AV. TEMP'S. INDICATED BY 10 THERMO-COUPLES IN CONTACT WITH THE SURFACE ON THE UNEXPOSED SIDE AT 2 MIN. INTERVALS DURING TEST.
FIRE OUT AT 75 MINUTES.

Fig. 14. Fire test of panel of Locklath and plaster with results graphically shown

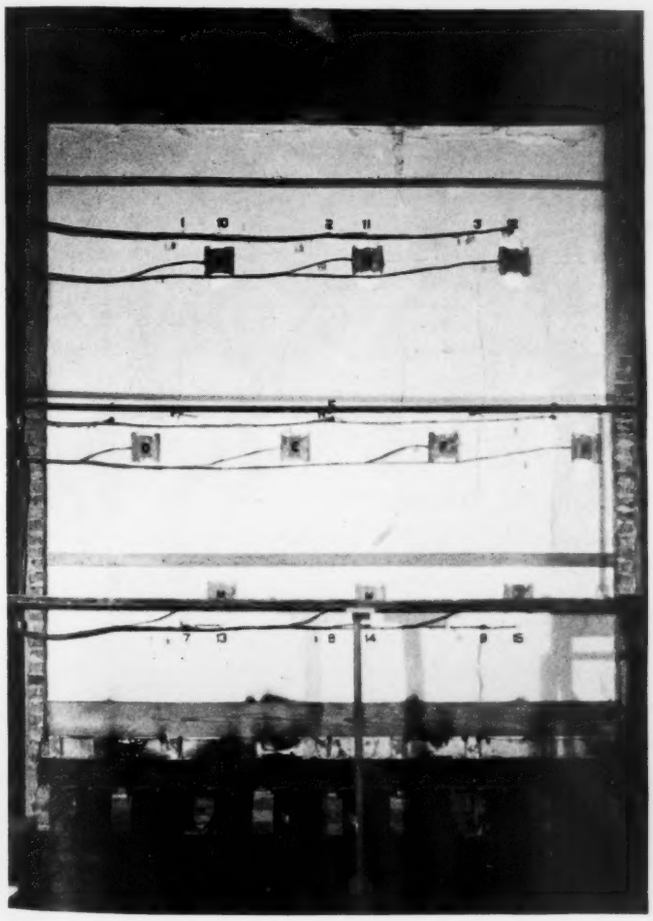


Fig. 16. Unexposed side two minutes before end of fire test

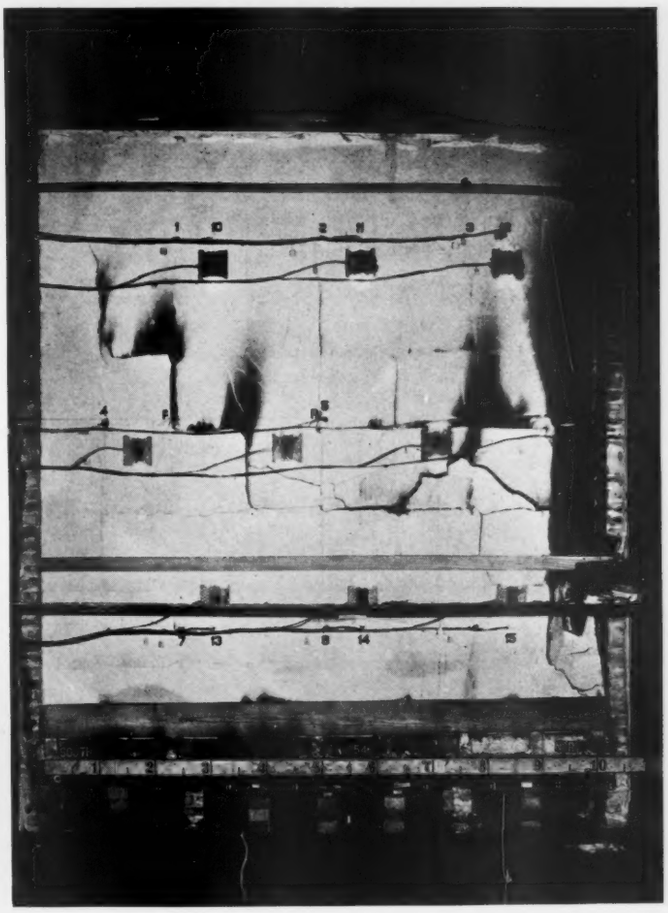


Fig. 17. Unexposed side at end of fire test (75 minutes)

the total assembled weight being less than 300 lb. Its success is well established by the fact that all wallboard and Locklath produced by the Plastoid Products, Inc., is served with plaster mixed in this mixer, and it is predicted that this type machine will be adopted by many wallboard plants in the future.

Drying

Like practically all large wallboard producers, the Plastoid Products, Inc., quickly realized the importance of drying the boards in a flat horizontal position, and although there was equipment to be had for this purpose, they decided to design their own devices for this also. The result was a kiln car equipped with a number of horizontal shelves on which were run the boards directly from the board machine. In operation the car is placed on a specially designed elevator which, when in its completely depressed position, allows the first board to run from the board machine to the top shelf (see Fig. 8). The single attendant then elevates the car one step higher, bringing the second shelf in line with the board machine. This operation is repeated until the car is completely filled, at which time it is rolled from the elevator and replaced by an empty car, the change being so timed that there is no halting of the board machine. The loaded cars are delivered to the kilns where they are automatically drawn through at such a rate that the boards are dry when the discharge end is reached. It is claimed that lower drying costs are obtained by this system than by any system for the purpose now in use.

The Plastoid Products, Inc., recently built and placed in operation in Los Angeles a complete new wallboard plant (Fig. 9) embodying all of the improvements mentioned above, specializing in the manufacture of wallboard and Locklath. The remarkable success of Locklath has induced the promotion of many schemes in its imitation and therefore for the protection of the public the company has established at considerable expense a market standard through exhaustive tests performed by the Underwriters Laboratories at Chicago. These tests are recorded under "Retardant No. 1954. April 13, 1927. Report on Locklath Plaster Board (Plaster Base), Plastoid Products, Inc., Los Angeles, Calif.," and comprise the standard fire-endurance, fire-and-fire-stream and excess load tests. A complete report of these tests may be had by application to the Underwriters Laboratories, but a few of the illustrations are included herewith (see Figs. 10 to 20) together with some of the most important conclusions arrived at by the laboratories. In these conclusions particular attention is called to the statements in reference to the bonding qualities of Locklath.

Bonding Qualities of Locklath

The following is an extract from the "Conclusions" arrived at by the Underwriters Laboratories at Chicago in their report recorded under "Retardant No. 1954":

"This section contains conclusions together with citations of evidence supporting the conclusions regarding the properties of Locklath as described herein, the fire retardant properties of an interior wall and partition finish of Locklath and gypsum plaster; and the fire retardant properties of load bearing, fire-stopped, wood-studded partitions provided with such finish on both sides.

* * * * *

"A load bearing partition made up of wood studs, 2x4 in. spaced 16 in. on centers, effectively fire-stopped, finished on both faces with Locklath and sanded gypsum plaster as described in this report will delay the spread of fire from one portion of a building to an adjacent portion for at least one hour.

* * * * *

"The partition retarded the transmission of heat and the passage of flame and hot gases to the unexposed side for 1 hr. and 15 min., when the partition failed under load. At this time several studs buckled and broke providing one large and several small openings in the finish on both sides of the partition through which a large volume of flame passed. The heat insulating qualities of the partition are such that critical temperatures are not reached on the unexposed face for 1 hr. and 15 min.

* * * * *

Stability of Partitions

"A partition constructed as described in this report, exposed to fire on one side, will carry its normal rated superimposed load for at least one hour. Its stability as indicated by the standard fire-and-fire-stream tests, followed by the standard excess load test, is such as to warrant its classification as a one-hour partition.

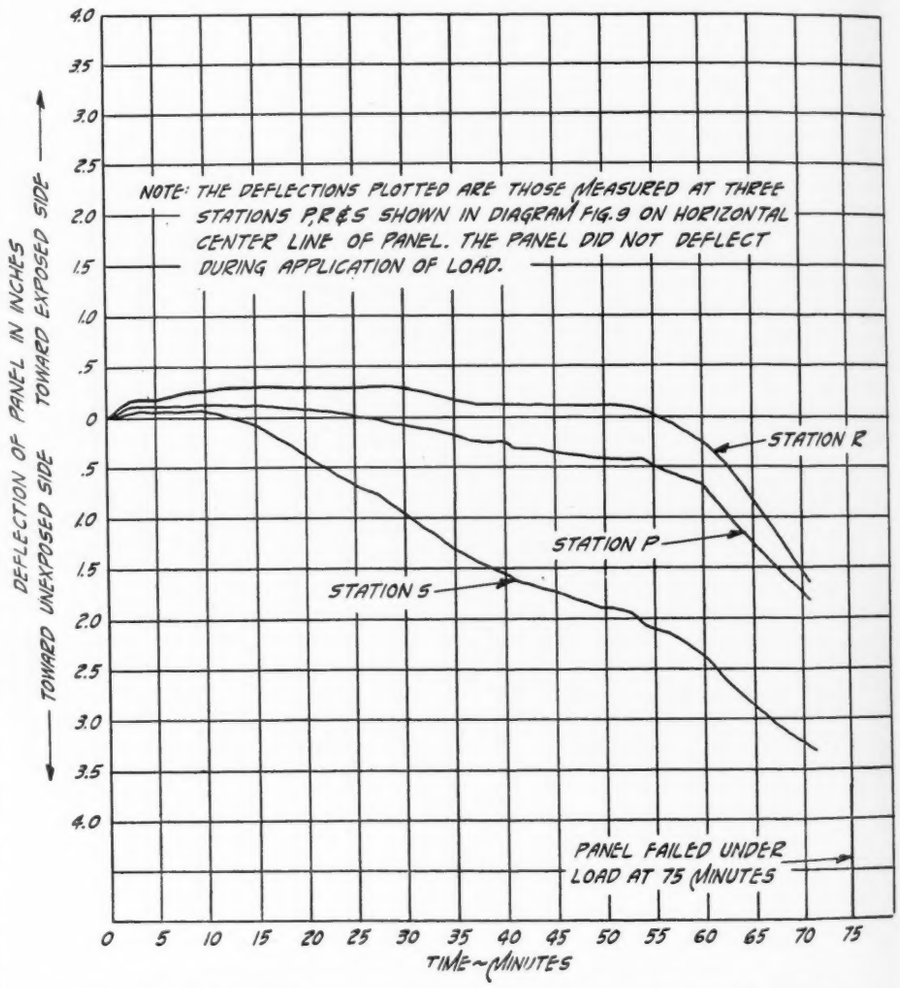

NOTE: THE DEFLECTIONS PLOTTED ARE THOSE MEASURED AT THREE STATIONS P,R&S SHOWN IN DIAGRAM FIG.9 ON HORIZONTAL CENTER LINE OF PANEL. THE PANEL DID NOT DEFLECT DURING APPLICATION OF LOAD.
STATION R
STATION P
STATION S
PANEL FAILED UNDER LOAD AT 75 MINUTES
DEFLECTION OF PANEL IN INCHES
TOWARD EXPOSED SIDE
TOWARD UNEXPOSED SIDE
TIME-MINUTES
4.0 3.5 3.0 2.5 2.0 1.5 1.0 .5 0 .5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

Fig. 15. Curves showing deflections of partition panel under load and during fire test

"The partition exposed to the fire endurance test carried its normal safe superimposed load for 75 min. before various stud members buckled and broke under this load, following rapidly increasing bulging at 60 min. Although some of the studs in the partition had bulged over 3½ in. toward the unexposed side, *the plaster, while quite generally cracked, did not spall off from its Locklath base and continued to serve as an effective barrier to fire.*

"The partition exposed to the fire-and-fire-stream tests carried its normal safe superimposed load during and after this test for a cooling and drying period of 22 hr.

Fig. 18. Exposed side before quenching with water after expiration of fire test

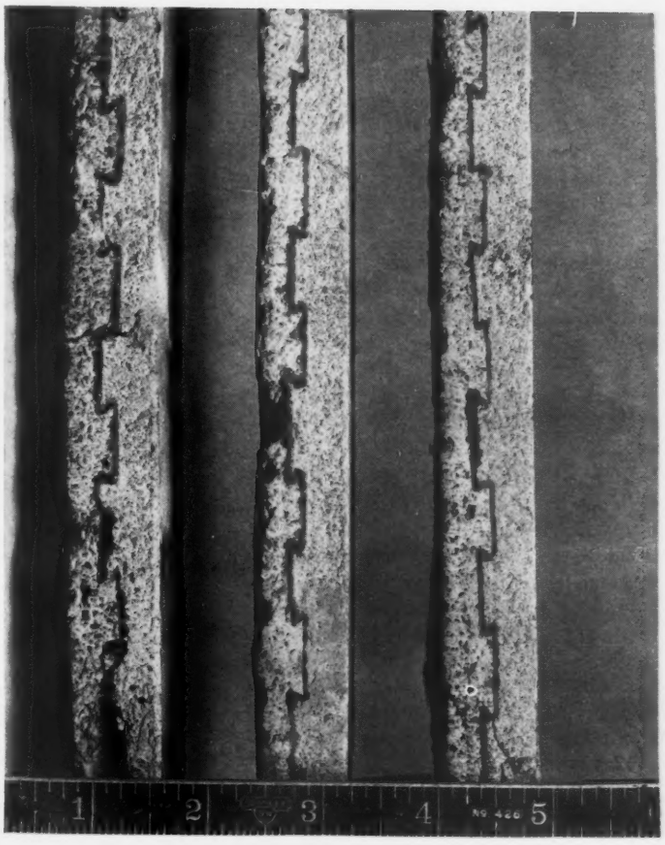


Fig. 19. Typical cross-section after fire and water tests of the unexposed face

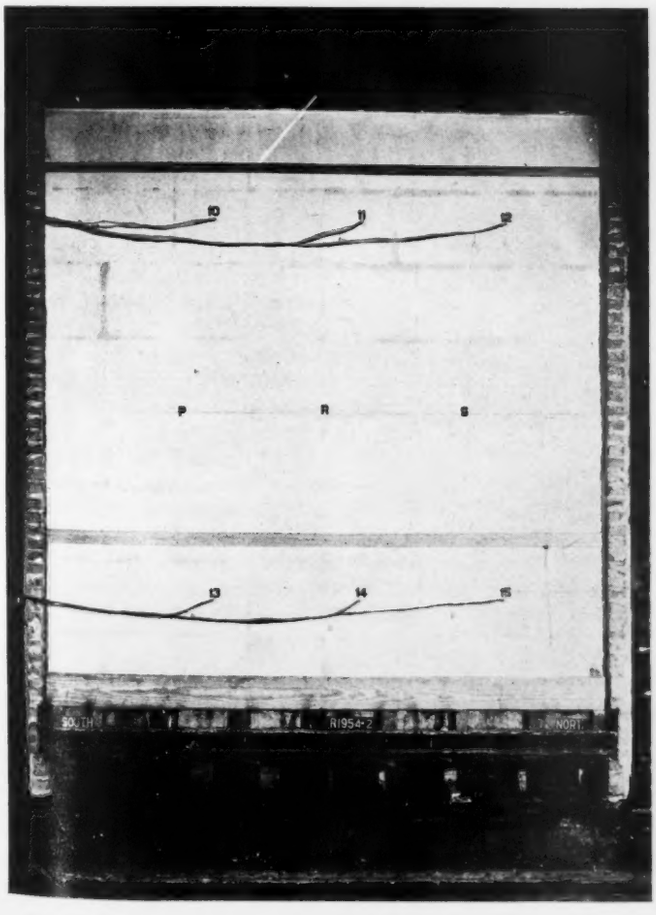


Fig. 21. Unexposed side of panel after withstanding stream of water

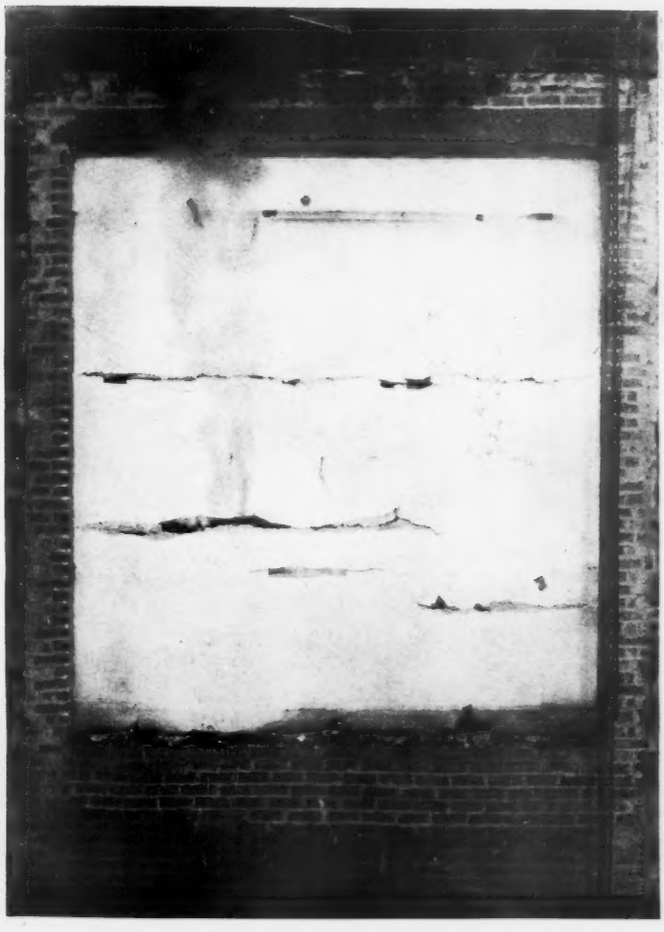


Fig. 20. Exposed side of panel just after withdrawal from furnace, before quenching

without any evidence of distress. The fire stream dislodged the Locklath and plaster finish on the exposed side but *did not penetrate nor dislodge any of the finish on the unexposed side.* After the 22 hr. cooling period, the partition carried a load equal to twice its safe normal superimposed load for 5 min. without apparent distress.

Practicability

"The dovetailed grooves form an effective mechanical key with the plaster so that the plaster is bonded to the Locklath base mechanically as well as by the natural bond between the gypsum and the fibrous surfacing material with which the Locklath core is covered."

In addition to the tests on Locklath carried out by the Underwriters Laboratories, many other special tests have been made by disinterested parties and in competition with other materials where special qualities, such as soundproofing, were sought; a number of these tests have shown quite remarkable results. For instance, a bonding strength test was performed by the Smith-Emery laboratory of Los Angeles by sealing a wire screen in a 1⅛ in. plaster coat placed over a 12x12 in. piece of Locklath which had been securely nailed to a 2x12 in. plank supported on vertical studs. The screen was allowed to project at the bottom where it was fastened to a ¾ in. iron rod from which a weight was suspended at the center. This weight was increased until failure occurred. Two tests were performed, and in one case the plastering failed along the line of the screen and in the other the screen itself failed where it was attached to the iron rod, no semblance of failure occurring along the line of contact with the Locklath. The sketch accompanying the original report on these tests is shown herewith, Fig. 22, and the method is self-explanatory.

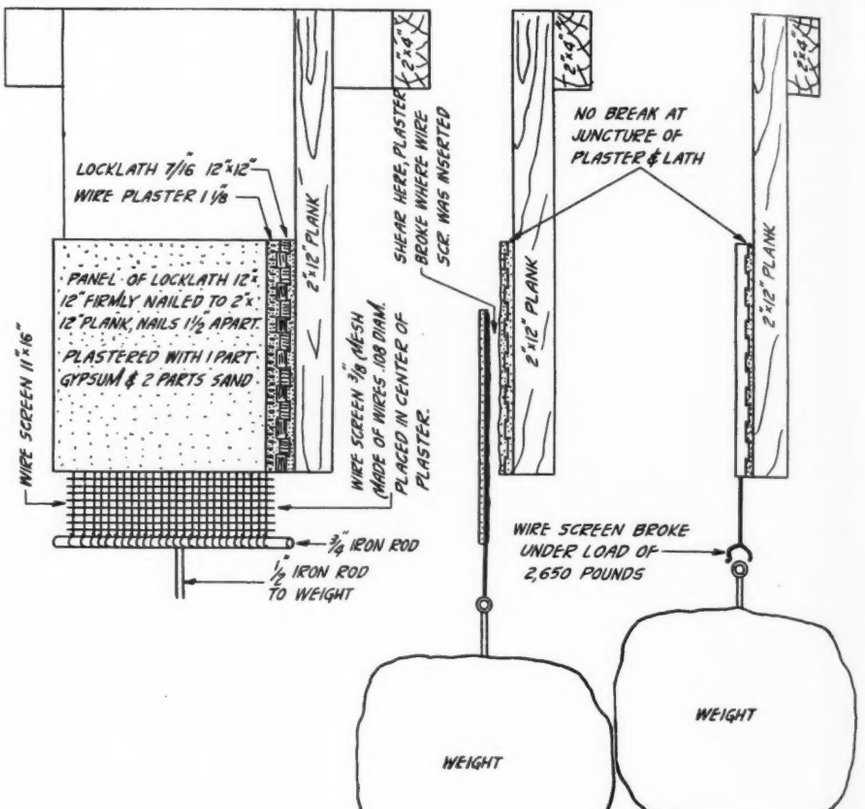

LOCKLATH 7/16" 12"x12"
WIRE PLASTER 1 1/8"
PANEL OF LOCKLATH 12" 12" FIRMLY NAILED TO 2"x 12" PLANK, NAILS 1½" APART.
PLASTERED WITH 1 PART GYPSUM & 2 PARTS SAND
WIRE SCREEN 11"x16"
2"x12" PLANK
WIRE SCREEN ⅜" MESH (MADE OF WIRES .108 DIAM.) PLACED IN CENTER OF PLASTER.
SHEAR HERE, PLASTER BROKE WHERE WIRE SCR. WAS INSERTED
NO BREAK AT JUNCTURE OF PLASTER & LATH
2"x12" PLANK
2"x12" PLANK
¾" IRON ROD
½" IRON ROD TO WEIGHT
WIRE SCREEN BROKE UNDER LOAD OF 2,650 POUNDS
WEIGHT
WEIGHT

Fig. 22. Bonding strength of Locklath illustrated, together with method of testing

When the exclusive Wilshire boulevard apartments, "Los Altos" (Fig. 23), was being built in Los Angeles, Professor Knudsen of the University of California, southern branch, was requested by the architects to make comparative tests on a number of recognized partition materials with regard to their sound insulating values. Out of 11 such materials submitted for test, Locklath proved highest as a sound insulator, having almost 25% higher insulating value than its nearest competitor. On the strength of this test Locklath was used throughout this building as a plastering base.

Fig. 23. Typical Los Angeles apartment house, where Locklath was used

Shear Tests on Sand-Lime Brick

IN connection with an investigation of the strength of bond between mortar and sand-lime brick, a considerable number of physical tests have been made.

The apparatus used was designed at the bureau. In carrying out the test a cylindrical core is sheared out of the brick, the shearing strength being found by dividing the applied load by the area of the cylinder, exclusive of the ends.

There were 701 "normal" half bricks tested in this way, the "normal" half bricks being about 2¼ in. in thickness. The average shearing strength value obtained was 1055 lb./in.², which was slightly less than one-half of the average value obtained in the compressive strength tests when the bricks were tested on edge.

In order to compare the effect of thickness of brick upon the shearing strength, a further test was made on 25 brick, which gave an average shearing strength of 805 lb. for the "normal" half brick. The other halves were cut lengthwise to give sections about 1 in. in thickness, and these gave an average of 1650 lb./in.²—*Technical News Bulletin,* U. S. Bureau of Standards.

H. Dittlinger Hailed as History Maker in Texas

UNDER the caption "Texan Uncovers the Secret of Plastic Lime," two pages of the *San Antonio Express*, for Sunday, October 23, 1927, are devoted to H. Dittlinger, president of the Dittlinger Lime Co., New Braunsfels, Tex. The process which Mr. Dittlinger has patented for making plastic hydrates of common limes was described in detail in ROCK PRODUCTS, September 17, p. 84.

Some of the *Antonio Express* article relating to Mr. Dittlinger's life and experience will be of interest to his many friends in the industry. We quote as follows:

"On his experiences along the long road to uncover the secret of lime manufacture, Mr. Dittlinger had this to say: 'I come from Missouri, born at Cape Girardeau in 1859. You have to show me. That is the slogan of Missouri and I have made it my own. My father was one of the political fugitives and came over with a number of other refugees from Bavaria and Hessen-Darmstadt. He landed in New York in 1849 with one dollar to his name. Working his way westward he had to take any kind of work and I remember his telling about the time he broke rock on the roads in the day time and had a school where he gave lessons in Latin at night. Maybe that was where he learned to break rock to make lime. After he landed at Cape Girardeau he settled down and established the largest lime business in the West, operating as many as five kilns before the Civil War. One of his most intimate friends was Carl Schurz, who in the late 50s was editor of the *Westliche Post* in St. Louis and was a frequent week-end guest at our home.

"'While in the lime business my father supplied nearly all the lime to the sugar industry in the South, Alabama, Georgia, Mississippi and Louisiana.

"'While a lieutenant in the Quartermaster's Department during the Civil War his establishment had a large shipment of lime en route to the South, which was blockaded at the Mason and Dixon line at Cairo, Ill. In trying to save this, he followed the shipment on the next steamer, from which he had to swim ashore through ice in the river and then fight his way through swamps of the Mississippi before he reached any habitation. The result was that he lost 1000 bbl. of lime and his health. At the end of the war he came to New Braunfels, an invalid, but too late to be saved, and died and was buried there in 1866.

"'I was then sent to Europe for an education and attended school and college, afterwards serving an apprenticeship until 1875. Returning to Cape Girardeau, I found my father's holdings, as a consequence of after-the-war conditions, either sold or so heavily involved that there was no chance for me. So I started to Texas, then considered a wilderness, to see my father's resting place and find a future for myself. I arrived in New Braunfels in April, 1876, and have been a resident citizen ever since, first trying my luck on the farm and later as a clerk in the general merchandise business. In 1881 my employers sold out the business to another one of their clerks and myself and we started in the hardware and implement business under the firm name of Faust and Dittlinger and later on branched out into the general merchandise business.

"'In 1886 we built the first large ginning plant in Southwest Texas and later added a corn mill. A few years afterward we built a modern flour mill in a modest way. In 1901 Mr. Faust withdrew and after that we developed the H. Dittlinger Roller Mills Co.

"'During all these years I had my eye on the limestone deposits in this section of the country, having in mind my father's activities long ago in Missouri.

H. Dittlinger, president of the Dittlinger Lime Co., New Braunsfels, Tex.

"'In 1907 I took some samples of this stone to Philadelphia and had it burned into lime. We found among a number of samples that the stone now used by the Dittlinger Lime Co. was by far the best anywhere in the neighborhood in a radius of 100 miles.

"'The Dittlinger Lime Co. started in business in 1907 and in its efforts to produce the highest possible quality product erected the first lime hydrating plant west of the Mississippi river. The lime manufactured at this plant proved from the start to be the very highest quality both for its chemical and physical properties and its whiteness. It stands unsurpassed today by any lime in the United States.

"'It is a well known fact that the Romans had a law that lime had to be aged in putty form for three years before being used. In Europe lime putty was aged a year and in many places this practice is kept up today. In southern France and Germany I found this on a visit there two years ago. The American has not the patience to wait so long and hydrated lime solved the problem, as it could be used with safety after soaking 24 hours. However, this lime did not have the easy spreading qualities which the artisan plasterer was accustomed to with aged lime putty.

"'Accidentally, it was found that in a small area in Ohio there was a dolomitic limestone which after being burned and hydrated yielded a plastic hydrate, that is, a hydrate which after being soaked 24 hours would work as smooth and easy as the old-time aged putty. Immediately this property was recognized by the trade and as a result the lime industry in this favored section of Ohio prospered exceedingly and grew beyond all expectations and this Ohio product is shipped today all over the United States, as it has had practically no competition. From the beginning I was puzzled why this condition should exist in lime made in a comparatively minute area in the United States and I always had the notion that a product produced in nature's laboratory could be reproduced in man's laboratory.

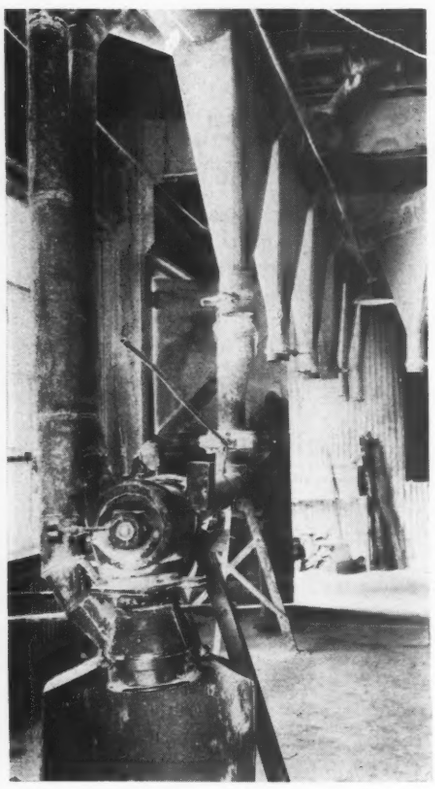
"'For this reason we started out to study the chemical and physical properties of different limes. We were very much surprised to find that lime in its ultimate unit is one of the smallest units in the universe. The optical microscope at 2500 diameters failed to reveal the unit. It was therefore much more surprising that a material of such a finely divided unit would show such widely different physical properties. However, such is the case. Furthermore it was definitely impossible to find any distinction between plastic and non-plastic lime under the highest magnification. We started out to try to duplicate the process as was in nature's laboratory and worked a long time with no apparent success. Gradually we would find one reaction or another that held out hope, but it was only after years of intensive research and experimentation that we succeeded in solving the elusive problem of lime plasticity. We can now make practically every lime we find in the United States into a plastic finishing hydrate, but at that no two limes are alike and we have to select our peptizing agents for specific materials which we are enabled to do from our vast line of experiments. As is often the case when a problem is solved in the laboratory, upon adaptation the manufacturer is frequently enabled to produce better results than a natural product obtains. Such is the case with plastic hydrated lime.

"'A source of gratification to me is that we have been able to solve this problem in a Texas laboratory for Texas people primarily and have thus been able to keep Texas to the front as a research center and foremost industrially.'"

Hints and Helps for Superintendents

A Dustless Home-Made Bagger

THE bagging of pulverized material is attended with more or less dust which is a nuisance and sometimes dangerous to the health of the workers. This is particularly true where pulverized silica is being sacked, so J. A. Dummett, superintendent of the Wedron Silica Co., Wedron, Ill., devised an ingenious packer with a dust collecting attachment for use at his plant.



Home bagging machine for pulverized materials

With reference to the accompanying diagram and picture, the pulverized silica is drawn from the storage bins to a feed pipe in the packing room. This feed pipe passes the material to a horizontal screw running in a galvanized iron pipe. The amount of pulverized silica entering the screw is controlled by a hand-operated valve and once this is fixed the operator need only attend the sacker. A push-button control located at the sacker works the motor driving the screw feeder and to prevent excess material falling into the bag a hand valve is placed across the mouth of the bagger.

The bagger itself is made of sheet iron, semi-circular in shape, so that the sack as it is filled is pressed firmly against the sides. The head of the bagger is a double walled cylindrical sheet-iron pipe, the space between the walls being connected to an air suction system operated by a small fan. Any surplus material in falling is either drawn up through the head of the bagger to a dust bin or falls through an iron grate on which the bag rests to a box below, from which it is carried by the air suction system to the dust bin.

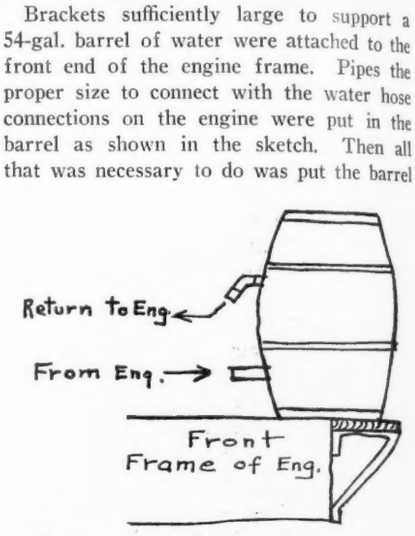
Employes soon learn to operate the bagger quickly and efficiently, Mr. Dummett says. As a precaution against settled material filling the air suction pipes and thus not allowing the dust collection apparatus to work properly, a series of "V" shaped hoppers are put into the main pipe running to the dust bin. As may be readily seen, these would have to fill up first before the pipe would clog and when this occurs it is a simple matter to allow the settled material to run out—merely opening the hand valve on the bottom of the V.

Emergency Cooling System for a Gasoline Engine

By W. L. HORNE
Consulting Engineer, Pine Plains, N. Y.

DURING that time of the year when about every other day was freezing and every other day was warm, a quarry operator experienced having the radiator on his gasoline dinky freeze and break beyond repair. Not having another radiator available and not wanting to lose any more time than was necessary the following unsightly but quite effective expedient was resorted to:

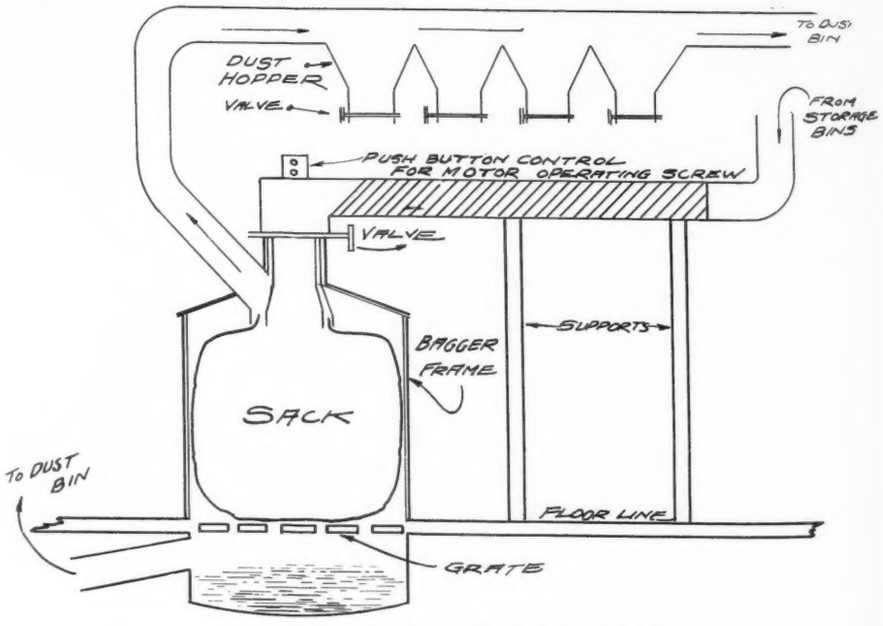
Brackets sufficiently large to support a 54-gal. barrel of water were attached to the front end of the engine frame. Pipes the proper size to connect with the water hose connections on the engine were put in the barrel as shown in the sketch. Then all that was necessary to do was put the barrel



Emergency gasoline-engine cooling machine

in place, make the water connectons with the engine, fill the barrel with water and the outfit was ready to go. The outfit, although peculiar in appearance, was most satisfactory and ran that way until the proper radiator was secured.

Although the writer saw this outfit perform during rather cold weather, he believes that it would also work out quite well in the warm summer months should a radiator be damaged by a wreck or by other causes. However, it is needless to say that it would not be much good on steep grades.



Detail of home-made bagging machine

Carrying Safety into the Quarry

ONE obvious problem in quarry safety work is to get the message over to foreign-born laborers in concise terms. Herewith is a card 14x22 in. (actual size) that Miss Mary E. Squire, general manager of the Allwood Lime Co., Manitowoc, Wis., has posted prominently about her plant. The captions of the Italian paragraphs are printed in red, the rest in black. Note the psychology in the prominent heading "ORDERS" by the Industrial Commission at Madison. This obviously means something to the dullest and commands respect that mere picture posters do not, however educational they may be.

ORDERS

By Industrial Commission at Madison

For Quarrymen

1. Reporting Injuries. In case of accident, no matter how slight, even a slight cut or break of the skin, report to your foreman at once and have it taken care of in a clean way.

1. Riporto Di Ingiurie. In caso di accidenti, non importa di che gravita', anche per un leggero taglio, o per una semplice lesione della pelle, devi subito riportare al tuo capo, cosi' egli potra' prendere cura di te.

2. Loose Rocks Overhead. When working in the quarry always look out for loose rock above, which may fall and injure you. A small rock the size of your fist, if it falls thirty feet, may kill you.

2. Pietre Che Si Staccano Dall'Alto. Durante il lavoro in una cava di pietre, fai sempre attenzione alle pietre che si possono staccare dall'alto, e che cadendo, ti possono far del male. Una pietra piccola, circa la misura del pugno, cadendo da trenta piedi, ti puo' anche uccidere.

3. Rocks Fall From Piles. Be careful when working around piles of stone. There is always danger that a rock may become loosened and fall and strike you.

3. Pietre Che Cadono Da Massi Di Pietre. Fai attenzione quando lavori vicino a mucchi di pietre; c'e' sempre il pericolo che una pietra si puo' rallentare, cadere e colpiriti piu' o meno gravemente.

4. Stepping on Stones. Before stepping on a stone always look to see that it is solid. A rocking stone may cause you to lose your footing and fall and break your leg.

4. Camminando Su Pietre. Prima di mettere il piede su una pietra, guarda prima se e' solida. Una pietra che non e' sicura, si puo' smuovere sotto i piedi, e rotolando, farti cadere, correndo tu il pericolo di romperti una gamba.

5. Talking to Hoistman or Signal Men. It is always dangerous to talk to the hoistmen or signal man. Remember that if you attract their attention from their work for only a minute it may cause them to make a serious mistake and lives of the men in the quarry may be in danger.

5. Parlando Con Uno Che Solleva Le Pietre, O Con L'uomo Che Da, I Segnali. E' sempre pericoloso parlare con l'uomo che solleva le pietre, o con l 'uomo che da' i segnali. Ricordati che se tu distogli la loro attenzione dal lavoro per un solo minuto, puo' causar loro di fare gravi sbagli e le vite degli uomini nella cava possono essere in pericolo.

6. Dragging Stone. In dragging stone, do not stand in front. The cable or hook may break and strike you.

6. Trascinando Pietre. Quando trascini delle pietre, non ti mettere mai in fronte ad esse. Una corda o il gancio si possono rompere, e tu puoi rimanerne colpito.

7. Wedging Stone. In wedging stone apart, always insert a stone or wedge in the break before you insert your hands. When driving wedges stand in line with your break; many have been severely crushed by the stone falling sideways.

7. Spaccando Pietre. Nello spaccare una pietra in due parti, sempre inserisci un sasso o un pezzo di metallo nella spaccatura, prima di mettervi le mani. Quando spacchi una pietra, sempre mettiti in linea con la spaccatura; tanti sono rimasti schiacciati da pietre cadute dai lati.

8. Walking on Tracks. Be careful when walking on the car tracks. You are always in danger of being struck by the cars.

8. Camminando Sulle Rotaie. Fai attenzione quando cammini sulle rotaie dei carri. Puoi correre sempre il pericolo di essere investito da essi.

9. Danger at Bottom of Incline. When the car is going up the incline of the crusher, don't follow it or stand on the track at the foot of the incline. There is always danger that the cable may break or some other part give way, and you may be struck by the car and be killed.

9. Pericolo Stando Ai Piedi Di Un'altura. Quando un carro sta salendo un'altura per raggiungere la macchina che schiaccia le pietre, non seguire il carro, e non stare sulle rotaie ai piedi dell 'altura. C'e' sempre il pericolo che qualche corda si rompa, o qualche parte si stacchi, e tu puoi essere investito dal carro, ed anche rima nerne ucciso.

10. Report Dangerous Conditions. Every man in this quarry must report to his forman any condition or dangerous practice which he thinks may cause an accident. The only way to have a safe quarry is for every man to do his part.

10. Per Riporti Di Condizioni Pericolose. Tutti i lavoratori in questa cava devono riportare al capo qualunque condizione pericolosa che essi credono possa essere causa di accidenti. L'unico modo di avere sicurezza e non temere pericoli in una cava, sta in ogni uomo di fare la sua parte.

11. Compressed Air is Dangerous. Compressed air must not be used for cleaning clothes or for horse-play.. Pointing air hose at persons has resulted in serious injuries, and is strictly forbidden.

11. L'aria Compressa E' Dannosa. L'aria compressa non deve essere usata per pulire abiti, o usata per scherzo. Mandando il tubo dell'aria compressa contro le persone, sono risultati dei casi molto seri di ingiurie, ed e' severamente proibito il farlo.

A synopsis of the Wisconsin Industrial Commission's rules for quarry safety in English and Italian

Wanted—Data on Rotary Kiln Lime Burning

A MANUFACTURER OF LIME by the rotary-kiln process asks the assistance of ROCK PRODUCTS readers in solving a problem that we know troubles every operator of a rotary lime kiln. This department, designed especially for operating men, seems the place to present the problem. Please address all communications relative to this to the Lime Editor, ROCK PRODUCTS. The problem is:

"Ours is an especially pure high calcium stone and therefore well suited for use in the chemical industries. Producer gas was originally selected for firing our kilns so that there would be the least contamination of the lime from unburned fuel and ash carried into the kiln. Producer gas or oil seemed particularly suited for this purpose. Pulverized coal has certain other advantages and we would like to learn if there are any plants using rotary kilns that have found pulverized coal satisfactory considering the ash and unburned coal contamination of the lime. Of course, we realize that for certain purposes, such as building lime, the small amount of contamination is of no importance; for the chemical trade it may or may not be important, depending upon the process.

"I have seen samples of lime from one plant using pulverized coal which showed no discoloration of the lime because of the fuel, but I have not been able to learn whether the sample was representative of the average condition of output and have learned nothing about its chemical analysis. It is the chemical analysis of the final product in which we are particularly interested.

"The quality of coal used and the fineness to which it is pulverized will probably have considerable bearing upon the resultant lime. There is some thought that with very fine pulverizing the greater portion of the ash will be carried through the kiln, rather than be deposited inside. This may or may not be true. When starting up with a cold kiln there is almost sure to be a certain amount of unburned fuel deposited upon the lining, due to the chilling action of the cold brick. This condition might be expected with any type of fuel, but would probably be more noticeable with pulverized coal.

"With small rotary kilns it is possible that the cost of equipment for producer gas would be as cheap as that for pulverized fuel, but with large size kilns, I do not know of any commercial gas producer large enough to permit the kiln to be actually forced without the use of more than one producer per kiln. With large kilns a single large size gas producer probably costs more than a unit pulverizer and takes up much more space in the plant than a pulverizer. The cost of operation over a long period of time would probably be about the same for gas producer or pulverizer. I believe that the use of pulverized fuel offers greater flexibility of operation than does producer gas. What is your experience?"

Xmas Money

ANY superintendent, foreman or employe of a rock products plant can earn $5 easily by sending us a "Hint and Help." You are familiar with this department. You know what a "hint" is. Let's have the one you have been holding back for a chance to write NOW. —The "Hints and Helps Editor."

Sand-Lime Brick Production and Shipments in October

THE following data are compiled from reports received direct from 21 producers of sand-lime brick located in various parts of the United States and Canada. The numbe of plants reporting is five less than those furnishing statistics for the August estimate published in the September 17 issue. The statistics below may be regarded as representative of the entire industry, the reporting plants having about one-half the production capacity in the United States and Canada.

Production showed some decrease over the figures for September, but shipments by truck showed a marked increase, bringing total shipments above the September figure. Prices quoted by producers in various parts of the country remain practically the same as those given for September. There is a marked decrease in the stocks on hand.

The following are average prices quoted for sand-lime brick in October:

Average Prices for October

	Shipping Point	Plant Price Delivered
Albany, Ga.	$ 9.50	$ .....
Atlantic City, N. J.	14.00	.....
Buffalo, N. Y.	12.00	16.50
Dayton, Ohio	12.50	.....
Detroit, Mich. (2 plants)	.....	16.00
Detroit, Mich.	13.00	16.00
Detroit, Mich.	13.50	16.00
Grand Rapids, Mich.	12.50	.....
Hartford, Conn.	14.00	.....
Madison, Wis.	12.00	13.00
Menominee, Mich.	11.00	14.50
Michigan City, Ind.	11.00	.....
Milwaukee, Wis.	10.50	13.00
Minneapolis, Minn.	10.00	12.75
New Orleans, La.	.....	.....
Pontiac, Mich.	13.00	15.50
Saginaw, Mich.	12.00	.....
Sioux Falls, S. D.	13.00	15.00
Syracuse, N. Y.	18.00	20.00
Toronto, Canada	13.50	15.50-16.00
Woburn, Mass.	.....	16.00

The following statistics are compiled from data received direct from 23 producers of sand-lime brick in the United States and Canada:

Statistics for September and October, 1927

	*September	†October
Production	21,679,785	18,927,980
Shipments (rail)	6,729,375	5,133,500
Shipments (truck)	11,815,061	13,622,733
Stocks	18,688,461	12,422,775
Unfilled orders	16,094,000	15,318,000

*Revised to include three plants not furnishing September data previously, 26 plants reporting.
†Incomplete, one plant not reporting stock, and five plants not reporting unfilled orders.

Notes From Producers

The Paragon Plaster Co., Syracuse, N. Y., report an order for 500,000 brick for a warehouse at Albany, N. Y. G. W. Thompson of Syracuse is the architect.

The *Brick Booster* of the Sand Lime Products Co., Detroit, Mich., reports that the company is furnishing all the interior brick, including the bearing walls, for the new Detroit Estates building at Maxwell and Harper avenues, Detroit. The new building will contain a theater, a dance hall, club rooms and 35 apartments, as well as a number of offices.

Clever Sand Advertising

THE magazine *Water Works* for July contains an exceptionally good advertisement of filter sand made by the United States Silica Co. of Chicago, which produces silica sand for many purposes at Ottawa, Ill. There is a use of the geological terms, "Silurian" and "St. Peters Sandstone," that is bound to arouse interest. But the main point made by the advertisement is that, "it comes well within the tolerances of the most exacting specifications of waterworks engineering practice," and figures are given to prove the statement. The advertisement follows:

A branded filter sand

WHAT ROBERT W. HUNT CO. SAY

Exhaustive tests of the nine leading brands of filter sand, made by Robert W. Hunt Co., developed the fact that SILURIAN embodies more factors of excellence than any other brand tested.

1. It is composed of durable grains of dense Flint without planes of cleavage.
2. It is WHOLLY free from clay, loam, and organic contamination.
3. It contains NO flat or micaceous particles (Tolerances permit 1%).
4. It contains NO calculable calcium or magnesium (Tolerances permit 1½%).
5. A test by Robert W. Hunt Co. showed its effective size to be .40 mm. and its uniformity coefficient 1.46.
6. It contains NO grains finer than .2 mm.

In every particular this sand comes well within the tolerances of the most exacting specifications of waterworks engineering practice.

A MANUFACTURED PRODUCT

Strictly speaking, it is not sand at all, but a manufactured product, for Silurian Filter Sand is secured by disintegrating St. Peters Rock—a Silurian formation—at our quarries at Ottawa, Ill. It goes through some ten washing and rinsing processes, pure SILURIAN spring water being used. Our steam-drying process subjects the sand to a sterilizing heat for several hours.

After drying it is stored in concrete bins, from which it is loaded, bone-dry, in paper-lined box cars. No freight to pay on water.

Send for free test sample—say, a 150-lb. bag.

Sent prepaid.

UNITED STATES SILICA CO.
122 South Michigan Ave., Chicago.

Utilization of Slag as a Highway Material

THE School of Mines and Metallurgy of the University of Missouri has recently published a new bulletin on the Utilization of Blast Furnace Slag in Highway Improvement. The author is Clarence E. Bardsley of that university, who has done considerable work in the study of aggregates for highway construction.

The bulletin, which is fully illustrated covers the use of slag as a highway material and a concrete aggregate comprehensively. It has been carefully prepared throughout, and furnishes a very good study of the work done by Professor Bardsley. One of the chapters takes up in detail the production of blast furnace slag in a concise and easily understood manner. A number of studies of slag concrete and slag roads were made by the author, and a full list of his conclusions and recommendations are given in the bulletin, so that altogether the work is probably the best treatise on the use of slag for highway purposes that has yet been published. The value of the book is particularly enhanced by an exceptionally complete bibliography of all books and papers available which concern this subject.

American Ceramic Society to Go on European Jaunt in 1928

ROSS C. PURDY, secretary of the American Ceramic Society, in company with P. G. B. Morriss, Morriss Service, Inc., sailed on Saturday, September 24, for a six weeks' trip to Europe. Mr. Morriss is director of the ceramists' tour abroad which is being planned for American ceramists next May (May 9-July 5, 1928). The object of this trip is to make final arrangements for the comfort and convenience of members joining this tour.

Mr. Purdy and Mr. Morriss will visit in England, France, Germany, Italy, Holland and Czechoslovakia, where contact will be made with the officials of ceramic industries to stimulate interest in the arrival of the American ceramists next May.

Steamship and hotel arrangements will be made at this time which will insure the American guests the advantages of the most excellent accommodations on their trip.

Not only will the trip be held early enough in the season to avoid the midsummer tourist rush, but Mr. Morriss with his long experience and thorough acquaintance with European hotels and railways will be able to secure advantages rarely obtained by European tourist groups. In fact, our ceramic members will be treated as "guests" and not tourists throughout this voyage and tour.

Editorial Comment

A 25th Anniversary

Next week the Portland Cement Association celebrates its 25th anniversary (1902-1927). During that period portland cement consumption in the United States has increased ten-fold. This year the German Portland Cement Manufacturers' Association celebrated its 50th birthday. In 50 years the consumption of cement in Europe probably *has not* increased ten-fold, or anything like that. In the United States the portland cement industry concentrated on one standard product and devoted its major effort to *promotion* and use of that product. In Germany great emphasis always has been laid on *research,* and much progress has been made in the development of cements with special properties. Undoubtedly both activities of the industry are highly desirable; but we believe the great difference in cement consumption in Germany and Europe and in the United States is largely accounted for by these two interpretations of an industrial association's *main* purpose—which is, of course, to increase the business of its members.

Confidence in Business

In our previous issue the editor was inspired to write a brief "sermon" on *fear in business* by a prominent producer who helped analyze some of its influences, particularly with reference to employes. The antithesis of *fear in business* is *confidence in business;* and another friend producer sends us the following true anecdote, which aptly illustrates the havoc caused by lack of confidence between competitors and between buyer and seller:

"I walked up the street this morning with an old friend contractor and he told me his principal grievance against some material men. These are his words and this his plaint: 'I wanted the Blank job and figured close for it; called in three material men and told them I wanted their very lowest and best prices for the sand and gravel without any jawing. I was the low bidder and landed the job. C's figure was low but both A and B came in with lower figures and without any effort on my part, that bunch called on me three different times, and each time cut each other a bit more. Talk about a lot of double-crossers, they cut me and themselves and each other. I don't like to do business with such men and I wish I didn't have to. All I ask of them is to give me their best figure the first time. Then, if they are equally firm with all the contractors, I can be sure that I am not at a disadvantage with some sharper buyer among my competitors.'"

It is not at all an uncommon experience for a producer who maintains his fair price to maintain at the same time his production and the demand for his product, in the face of cuts by competitors. The honest, square-shooting buyer knows that the unprincipled bidder who will double-cross his competitors will not hesitate to double-cross him with *his* competitors, if it becomes apparently advantageous to the bidder to do so. Confidence in the integrity and in the "intestinal stamina" of the producer as well as confidence in his product and his service is ever the basis of sustained demand for his product.

The tremendous growth of modern business is very largely the result of mutual confidence. The time was when all business transactions were conducted in cash, or its equivalent in portable goods. Gold and silver coins were bitten and rung and weighed—yes, even coin of the realm was not accepted at face value! Also the rule of business was "let the buyer beware." Through the centuries, in a few of the most civilized countries (or at least in the most progressive trading countries) paper money, or a promise to pay gold on demand, was accepted in business transactions, if the paper money was backed by a reputable government. Now practically all important business transactions, in the United States at least, are conducted with *private* paper money (or checks) which is only an individual's promise to pay, or a promise of his ability to pay. Thus is modern business dependent on, and the development of, universal mutual confidence.

Certainly it is a logical step, and eventually a necessary step, in our development of American business, to attain a point where confidence in one another extends to accepting a quotation on price—the seller's statement of the value of his product—with the same confidence as now in accepting the buyer's check—or his statement of his ability to pay for the product.

No business ever prospered, or long endured, which did not have at least some confidence of its customers. The day when a cheap undesirable commodity can be unloaded on a witless buyer, and a quick clean-up and get-away made, is gone now, if it ever did exist in such industries as these. The old rule of "let the buyer beware" is already discarded in all lines of real business.

When it takes from one to three years to turn over a capital investment, as it does in the rock products industries, and the profit in the turnover is seldom more than 10 to 15% net (in the long run), it certainly behooves the producer to so conduct his business that he can at least stay in business long enough to return his capital investment—a matter of 10 to 20 years.

All history proves, then, that the greater the confidence the greater the volume of business, and the sounder the structure of business. The United States today is an outstanding world's example of the truth of this. But axioms and laws of business economics apply to specific businesses as well as to general business. Failure to recognize this fact is expensive to numerous business enterprises.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Allentown Portland Cement Co. (common)[32]	Nov. 9	.....	3	6	
Allentown Portland Cement Co. (6% bonds, 1932)[32]	Nov. 9	.....	90	94	
Alpha Portland Cement Co. (common)[2] new stock	Nov. 4	No par	33	36	75c quar. Oct. 15
Alpha Portland Cement Co. (preferred)[2]	Nov. 4	100	115	.....	1¾% quar. June 15
American Lime and Stone Co. (7% bonds, 1942)[32]	Nov. 1	.....	100	102	
Arundel Corporation (sand and gravel—new stock)	Nov. 4	No par	46¼	47	50c Oct. 1
Atlantic Gypsum Products Corp. (1st 6's carrying 10 sh. com.)[10]	Nov. 9	.....	118	121	
Atlas Portland Cement Co. (common)[2]	Nov. 4	No par	40	43	50c qu. Sept. 1
Atlas Portland Cement Co. (preferred)	.....	100	.....	.....	2% qu. Oct. 1
Atlas Portland Cement Co. (preferred)[2]	Nov. 4	33⅓	43	.....	2% qu. Oct. 1
Beaver Portland Cement Co. (1st Mort. 7's)[8]	July 29	100	100	100	
Bessemer Limestone and Cement Co. (Class A)[4]	Nov. 4	.....	36½	37	75c quar. Oct. 31
Bessemer Limestone and Cement Co. (6½% bonds)[4]	Nov. 4	.....	100¼	101	
Bessemer Limestone and Cement Co. (common)	.....	.....	.....	.....	75c quar. Oct. 31
Boston Sand and Gravel Co. (common)	Nov. 4	100	76	78½	1% qu., 2% ex. Jan. 1
Boston Sand and Gravel Co. (preferred)	Oct. 21	.....	85	90	1¾% quar. Jan. 1
Boston Sand and Gravel Co. (1st preferred)	Oct. 21	.....	90	95	2% qu. Jan. 1
Canada Cement Co., Ltd. (common)	Nov. 4	100	247	247½	1½% quar. Oct. 17
Canada Cement Co., Ltd. (preferred)[11]	Nov. 4	100	121¼	123⅞	1¾% quar. Nov. 16
Canada Cement Co., Ltd. (1st 6's, 1929)[11]	Nov. 5	.....	101½	102½	3% semi-annual A&O
Canada Cement Co., Ltd. (new common)	Nov. 4	.....	32½	33	
Canada Cement Co., Ltd. (new preferred)	Nov. 4	.....	94	95	
Canada Cement Co., Ltd. (new units)	Nov. 4	.....	107	107½	
Canada Crushed Stone Corp., Ltd. (6½s, 1944)[11]	Oct. 21	100	96	99	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Nov. 7	No par	37½	39	50c Oct. 10
Charles Warner Co. (preferred)	Nov. 7	100	110	.....	1¾% quar. Oct. 27
Cleveland Stone Co. (new stock)	Oct. 26	.....	65	70	
Connecticut Quarries Co. (1st Mortgage 7% bonds)[17]	Oct. 31	100	105	.....	50c qu. June 15
Consolidated Cement Corp. (1st Mort., 6½s, series A)[24]	Nov. 9	100	96	99	
Consolidated Cement Corp. (5 yr. 6½% gold notes)[24]	Nov. 9	100	93½	98	
Consumers Rock and Gravel Co. (1st Mort. 7s)[18]	Nov. 4	100	99½	101½	
Coosa Portland Cement Co. (6% bonds, 1944)[32]	Nov. 9	.....	58	63	
Coplay Portland Cement Co. (6% bonds, 1941)[32]	Nov. 9	.....	90	.....	
Dewey Portland Cement Co. (1st mort. 6's 1942)[20]	Nov. 9	100	98½	100	
Dolese and Shepard Co. (crushed stone)[7]	Nov. 9	50	102	105	$1.50 July 1, $1 ex. July 1
Egyptian Portland Cement Co. 7% pfd.[21]	Nov. 7	.....	85	95	1¾% quar. July 1
Egyptian Portland Cement Co. (common)[21]	Nov. 7	.....	6	7	40c quar. Oct. 1
Egyptian Portland Cement Co. (warrants)	.....	.....	6	.....	
Fredonia Portland Cement Co. (6½% bonds, 1940)[32]	May 24	.....	97	101	
Giant Portland Cement Co. (common)	Nov. 8	50	40	45	
Giant Portland Cement Co. (preferred)	Nov. 8	50	40	45	3½% June 15
Ideal Cement Co. (common)	Nov. 7	No par	94½	96	$1 quar. Oct. 1
Ideal Cement Co. (preferred)[33]	Nov. 7	100	111	113	1¾% quar. Oct. 1
Indiana Limestone 7's (1936)	Nov. 9	.....	98	100	
International Cement Corporation (common)	Oct. 26	No par	56¼	.....	$1 quar. Sept. 30
International Cement Corporation (preferred)[2]	Oct. 26	100	110	112	1¾% quar. Sept. 30
Kelley Island Lime and Transport Co.	Nov. 4	100	180½	180½	$2 quar., $2 ex. Oct. 1
Lawrence Portland Cement Co.[2]	Nov. 4	100	101	104	2% quar.
Lehigh Portland Cement Co.	Nov. 8	50	119	123	1½% quar.
Lehigh Portland Cement Co. (preferred)	Oct. 24	.....	73	78	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1928 to 1931)[13]	Aug. 12	100	99½	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1932 to 1935)[13]	Aug. 12	100	97½	99	
Marblehead Lime Co. (1st Mort. 7's)[14]	Nov. 4	100	100	.....	
Marblehead Lime Co. (5½% notes)[14]	Nov. 4	100	98	.....	
Michigan Limestone and Chemical Co. (common)[6]	Nov. 4	.....	35	.....	
Michigan Limestone and Chemical Co. (preferred)[6]	Nov. 4	.....	25	27	1¾% quar. July 15
Missouri Portland Cement Co.	Oct. 26	25	38½	40	50c Nov. 1
Monolith Portland Cement Co. (common)[9]	Nov. 3	.....	12½	13	8% ann. Jan. 2
Monolith Portland Cement Co. (units)[9]	Nov. 3	.....	29	30½	
Monolith Portland Cement Co. (preferred)[9]	Nov. 3	.....	8¼	8¾	
National Gypsum Co. (common)[35]	Nov. 9	.....	37	39	
National Gypsum Co. (preferred)[35]	Nov. 9	.....	80	83	
National Gypsum Co. (pref. carrying acc. div.)[35]	Sept. 15	.....	86	88	
Nazareth Cement Co.[30]	Nov. 9	No par	32	34	75c quar. Apr. 1
Newaygo Portland Cement Co.[1]	Sept. 23	.....	110	110	
Newaygo Portland Cement Co. (6½% bonds, 1938)[32]	Nov. 9	.....	101	103	
New England Lime Co. (Series A, preferred)[14]	Nov. 4	100	.....	95	
New England Lime Co. (Series B, preferred)[22]	Sept. 26	100	97	99	
New England Lime Co. (V.T.C.)[22]	Sept. 26	.....	33	35	
New England Lime Co. (6s, 1935)[14]	Nov. 4	100	98	100	
New York Trap Rock Corp. (6% bonds, 1946)[32]	Nov. 9	.....	97	99	
North American Cement Corp. 6½s 1940 (with warrants)	Oct. 26	100	84	84	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common)[32]	Nov. 9	.....	30	40	2 mo. period at rate of 7%
North American Cement Corp. (common)[19]	Apr. 9	.....	8⅛	9	
North American Cement Corp. (preferred)	Apr. 25	.....	.....	.....	1.75 quar. Aug. 1
North Shore Material Co. (1st Mort. 6's)[15]	Nov. 9	100	98½	.....	
Pacific Portland Cement Co. (common, new stock)	Nov. 6	.....	25	26	
Pacific Portland Cement Co., Consolidated[5]	Oct. 21	100	61¾	.....	25c mo.
Pacific Portland Cement Co., Consolidated (preferred)	Oct. 21	.....	81	.....	
Pacific Portland Cement Co., Consolidated (secured serial gold notes)[5]	Oct. 20	100	98½	.....	3% semi-annual Oct. 15
Peerless Portland Cement Co.[1]	Oct. 24	10	3¾	4⅛	
Pennsylvania-Dixie Cement Corp. (1st Mort. 6's)[29]	Nov. 9	100	98¼	98¾	
Pennsylvania-Dixie Cement Corp. (preferred)[28]	Nov. 9	100	92	93	1¾% Sept. 15
Pennsylvania-Dixie Cement Corp. (common)[28]	Nov. 9	.....	23½	25	50c Oct. 1
Petoskey Portland Cement Co.[1]	Oct. 24	10	11¼	12	1½% quar.
Pittsfield Lime and Stone Co.[31]	Oct. 8	.....	.....	100	
Pittsfield Lime and Stone Co.[31] (common)	Oct. 8	.....	.....	25	

[1]Quotations by Watling, Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by True, Webber & Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [13]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hemphill, Noyes & Co., New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]William C. Simons, Inc., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]A. C. Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher & Co., Denver, Colo. [34]Kidder,, Peabody & Co., Boston, Mass. [35]Farnum, Winter and Co., Chicago. [36]Hanson and Hanson, New York.

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS (Continued)

Stock	Date	Par	Price bid	Price asked	Dividend Rate
Riverside Portland Cement Co.	May 9	.....	165	.....	50c monthly, $1.50 ex. Aug. 1
Rockland and Rockport Lime Corp. (1st preferred)[34]	Nov. 7	100	101	.....	3½% semi-annual Aug. 1
Rockland and Rockport Lime Corp. (2nd preferred)[34]	Nov. 7	100	40	65	3% semi-annual Aug. 1
Rockland and Rockport Lime Corp. (common)[34]	Nov. 7	No par	.....	50	1½% quar. Nov. 2
Sandusky Cement Co. (common)[1]	Aug. 2	100	125	135	$2 quar. Oct. 1
Santa Cruz Portland Cement Co. (bonds)[5]	Oct. 20	.....	105½	.....	6% annual
Santa Cruz Portland Cement Co. (common)[5]	Nov. 4	.....	85½	.....	$1 quar., $1 ex. Jan. 1
Schumacher Wallboard Corp. (common)	Nov. 4	.....	19	20	
Schumacher Wallboard Corp. (preferred)	Nov. 4	.....	25	26	
Southwestern Portland Cement Co. (units)	May 11	.....	205	.....	
Superior Portland Cement, Inc. (Class A)[20]	Nov. 4	.....	50	51¼	
Superior Portland Cement, Inc. (Class B)[20]	Oct. 20	.....	37½	40	
Trinity Portland Cement Co. (units)	.....	.....	152	.....	
United Fuel and Supply Co. (sand and gravel) 1st Mort. 6s[27]	July 14	100	98	100	
United Fuel and Supply Co. (sand and gravel) 6% gold notes[27]	July 14	100	98	100	
United States Gypsum Co. (common)	Oct. 26	20	99½	100	40c qu. $1 ex. Dec. 31
United States Gypsum Co. (preferred)	Oct. 26	123	123	.....	1¾% quar. Dec. 31
Universal Gypsum Co. (common)[3]	Nov. 9	No par	3½	5½	
Universal Gypsum V.T.C.[3]	Oct. 27	No par	2½	3	
Universal Gypsum Co. (preferred)[3]	Aug. 31	.....	40	.....	1½% Feb. 15
Universal Gypsum and Lime Co. (1st 6's, 1946)[3]	Nov. 9	100	100	96	
Union Rock Co. (7% serial gold bonds)[18]	Oct. 7	.....	Called as of Nov. 1, 1927		
Upper Hudson Stone Co. (1st 6's, 1951)[32]	Nov. 9	.....	93	.....	
Upper Hudson Stone Co. (1st 6's, 1937)[32]	Nov. 9	.....	93	.....	
Vulcanite Portland Cement Co. (7½% bonds, 1943)[22]	Nov. 9	100	106	109	
Whitehall Cement Mfg. Co. (common)[36]	Nov. 4	.....	150	.....	
Wisconsin Lime and Cement Co. (1st Mort. 6's, 1940)[15]	Nov. 9	100	99	101	
Wolverine Portland Cement Co.	Oct. 26	10	6¼	6¼	15c Nov. 15
Yosemite Portland Cement Co. (Class B, common)	Nov. 4	.....	4⅜	5	

QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

Stock	Date	Par	Price bid	Price asked	Dividend Rate
Asbestos Corp. of America (5 sh. pfd. and 5 sh. com.)[1]	June 22	.....	$1 for the lot		
Atlanta Shope Brick and Tile Co.[1]	Nov. 24	.....	25c	.....	
Benedict Stone Corp. (cast-stone) (50 sh. pfd. and 390 sh. com.)[1]	Dec. 29	.....	$400 for the lot	.....	
Blue Stone Quarry (60 shares)[2]	Mar. 16	.....	$10¾ for the lot	.....	
Coplay Cement Mfg. Co. (common)[4]	Dec. 16	.....	12½	.....	
Coplay Cement Mfg. Co. (preferred)[1]	Dec. 30	.....	70	.....	
Eastern Brick Corp. (7% cum. pfd.)[1]	Dec. 9	10	40c	.....	
Eastern Brick Corp. (sand lime brick) (common)[1]	Dec. 9	10	40c	.....	
Edison Portland Cement Co. (common)[4]	Sept. 11	50	20c	.....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	.....	
International Portland Cement Co., Ltd. (preferred)	Mar. 1	.....	30	45	
Globe Phosphate Co. ($10,000 1st mtg. bonds, $169.80 per $1000 paid on prin.)	Dec. 22	.....	$50 for the lot	.....	
Iroquois Sand and Gravel Co., Ltd. (2 sh. com. and 3 sh. pfd.)[1]	Mar. 17	.....	$12 for the lot	.....	
Knickerbocker Lime Co.(x)	June 22	.....	100	.....	
Limestone Products Corp. (150 sh. pfd., $50 par, and 150 sh. com., no par)	Dec. 22	.....	$60 for the lot	.....	
Missouri Portland Cement Co. (serial bonds)	Dec. 31	.....	104¾	104¾	3¼% semi-annual
Olympic Portland Cement Co.(g)	Oct. 13	.....	.....	£1⅝	
Phosphate Mining Co.[1]	Nov. 24	.....	1	.....	
River Feldspar and Milling Co. (50 sh. com. and 50 sh. pfd.)[1]	June 23	.....	$200 for the lot	.....	
Rockport Granite Co. (1st 6's, 1934)	Aug. 31	.....	90	.....	
Simbroco Stone Co.[2]	Apr. 20	.....	12	12	
Southern Phosphate Corp.[6]	Sept. 15	.....	1¼	.....	
Tidewater Portland Cement Co. (3000 sh. com.)	Dec. 22	.....	$6525 for the lot	.....	
Vermont Milling Products Co. (slate granules) 22 sh. com. and 12 sh. pfd.)[6]	Nov. 3	.....	$1for the lot	.....	
Wabash Portland Cement Co.[1]	Aug. 3	50	60	100	
Winchester Brick Co. (preferred) (sand lime brick)[5]	Dec. 16	.....	10c	.....	

(g) Neidecker and Co., Ltd., London, England. [1]Price obtained at auction by Adrian H. Muller & Sons, New York. [2]Price obtained at auction by R. L. Day and Co., Boston. [3]Price obtained at auction by Weilupp-Bruton and Co., Baltimore, Md. [4]Price obtained at auction by Barnes and Lofland, Philadelphia, Penn. [5]Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on November 3, 1925. [6]Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass.

Refinancing Canada Cement

IN CONNECTION with the sale and refinancing of the Canada, L't'd., Montreal, Que., a syndicate composed of Wood, Grundy and Co., L't'd., the Royal Bank of Canada and various banking houses in Canada and the United States is offering $20,000,000 in 5½% first mortgage sinking fund gold bonds and $21,000,000 in 6½ sinking fund cumulative preference shares. The remaining capital stock consists of 600,000 shares of common of no par value. The bonds were offered at 99; the preferred stock at 100, with a bonus of ⅖ share of common stock—the common stock being valued for purposes of fractional transfers at 25. The following financial data are furnished in connection with these offerings:

Bonds—The first mortgage bonds will be a direct obligation of Canada Cement Co., L't'd., and will be secured by specific first mortgage and charge on all the company's real and immovable properties, including lands, plants, buildings, machinery and equipment, and by first floating charge on all other assets. Such charges will cover all of the company's interest in assets hereafter acquired.

The total amount of first mortgage bonds which will be issuable under the trust deed, for the purposes and under the restrictions therein provided, is $30,000,000 or its equivalent in sterling at the rate of $4.86⅔ to £1. Bonds of any series, other than bonds of Series A, may mature not earlier than November 1, 1947. Bonds of any series will be issuable as coupon and fully registered bonds; and/or as registered debenture stock payable as to principal and interest only in London, England. The $20,000,000 bonds authorized for immediate issue will be offered as first mortgage sinking fund gold bonds, 5½%, Series A. At the option of the company and with the consent of the holder, bonds of Series A may be exchanged for an equal principal amount of registered debenture stock of Series A and vice versa.

Bonds of Series A and also any registered debenture stock of Series A which may hereafter be issued will be dated November 1, 1927, and will mature November 1, 1947. They will bear interest at the rate of 5½% per annum, payable half-yearly on May 1 and November 1, both principal and interest being payable, at the option of the holder, in United States or Canadian gold coin or in gold coin of the Kingdom of Great Britain at the fixed rate of $4.86⅔ to £1, and, as to registered debenture stock, only in gold coin of the Kingdom of Great Britain payable in London, England.

Bonds of Series A will be in the form of coupon bonds of $1000 and $500 registerable as to principal only, and fully registered bonds in denominations of $1000 and authorized multiples thereof. Registered debenture stock of Series A will be issuable in denominations of £1 or any authorized multiples thereof. Bonds and registered debenture stock of Series A will be redeemable in whole or in part at the option of the company at any time on 30 days' notice at the following prices and accrued interest: at 105 if redeemed on or before November 1, 1932; thereafter at 104 if redeemed on or before November 1, 1937, and thereafter at 103.

Additional bonds (including registered debenture stock) of Series A or of any other series will only be issuable to the extent of 66⅔% of the cost or appraised value, whichever may be less, of additional property, to be defined in the trust deed, and then only when the average annual net earnings, to be defined in the trust deed, of the company and its predecessor or predecessors and the earnings of any subsidiary company or companies for the two years preceding the date of application for issue of such bonds shall have been not less than twice the annual interest charges on all the first mortgage bonds of the company to be outstanding after the proposed additional issue.

Sinking Fund—The trust deed will provide for an annual cumulative sinking fund, commencing November 1, 1930, equal to 2% for each of the first five years and 3% annually thereafter of all the issued bonds of Series A (including registered debenture stock, if any) together with annual amounts

equal to interest on all bonds and registered debenture stock redeemed. These moneys are to be used for the purchase in the open market of bonds of Series A at or below the then redemption price but, failing such purchase, shall be paid to and used by the trustee for the redemption by lot of bonds, as will be provided in the trust deed.

Preference Shares—Of the $21,000,000 par value cumulative preference shares presently to be issued, not less than $13,000,000 will consist of shares of a par value of $100 each and not more than $8,000,000 will consist of shares of a par value of $5 each, all ranking pari passu. At the option of the company and with the consent of the holder, shares of $100 par value may be converted into an equivalent par value of shares of $5 par value, and vice versa.

The cumulative preference shares will be preferred as to capital and will be entitled to preferred dividends at the rate of 6½% per annum payable quarterly, but will not be entitled to further participate in the profits of the company. The cumulative preference shares now to be issued will be cumulative from December 1, 1927. Holders of $100 par value cumulative preference shares may register their shares with the company's registrar in either Montreal or Toronto; or with the registrar which the company may, at its option, appoint in the city of New York. Cumulative preference shares of $100 par value may be transferred, on payment of a reasonable fee, from the Montreal to the Toronto registry and vice versa; but may be transferred from the Montreal and/or Toronto registry to the New York registry, if any, and vice versa only with the consent of the company. The cumulative preference shares of $5 par value must be registered with the registrar in London, England. Dividends on cumulative preference shares having a par value of $100 will be payable by cheque in Canadian funds in the cities of Montreal or Toronto, or in United States funds in New York, according to the place at which such shares are registered; dividends on shares of a par value of $5 will be payable only in sterling, at the rate of $5 to £1, London, England.

Cumulative preference shares will be redeemable as a whole or in part at the option of the company on 60 days' notice at 110% of par value plus accured and unpaid dividends to date of redemption. In the event of voluntary liquidation of the company, holders of cumulative preference shares will receive 110% of par value of their shares plus accrued and unpaid dividends and, in the event of enforced liquidation such holders shall receive par plus accrued and unpaid dividends, in either case prior to any distribution to holders of any other class of shares of capital stock.

In case and as long as two quarterly dividends shall be in arrears and unpaid, holders of cumulative preference shares shall have one vote for every $100 par value of cumulative preference shares held by them, but shall not otherwise be entitled to voting rights.

Market or Sinking Fund.—After the conclusion of the first and each succeeding fiscal year, the company will set apart out of its earnings, before any dividend is paid, or set apart for payment, on its common shares, a sum equivalent to 6½% of its net earnings available for payment of dividends on the common shares. These moneys will be used to acquire cumulative preference shares at prices not exceeding their redemption price. Such shares shall be purchased at or below their redemption price, or redeemed by lot, and shall be canceled and not reissued.

The Company—Canada Cement Co., L't'd., will be incorporated under the laws of the Dominion of Canada to acquire from the company of the same name all of its properties and plants, together with well located areas containing almost unlimited deposits of limestone, clay and gypsum, the raw materials required for the production of portland cement. The company will also acquire all the shares and investments in subsidiaries of the old company.

Properties are strategically situated in relation to the consuming markets of Canada and to ports of export, and include plants at Montreal East, P. Q.; Hull, P. Q.; Belleville, Ont.; Lakefield, Ont.; Port Colbourne, Ont.; Tuxedo (near Winnipeg), Man., and Exshaw, Alta., which are well designed and which have been maintained in a high state of operating efficiency. The business is in a position to greatly increase its present output without further capital expenditure.

Canada Cement Co., L't'd. (old company) was established in 1909 to acquire a number of cement manufacturing businesses, two of which commenced to manufacture portland cement in 1889, the first year in which portland cement was produced in Canada. The business has experienced 18 years of successful and profitable operation and has become one of the largest manufacturers of cement on this continent.

Earnings.—For the 17 years ended December 31, 1926, net earnings of Canada Cement Co., L't'd. (old company), as shown by the company's annual statements, available for bond interest and depreciation, have been as follows:

1910	$1,277,697.84	1919	$3,057,553.81
1911	2,118,793.83	1920	2,362,742.13
1912	2,734,579.62	1921	2,636,460.84
1913	2,748,080.64	1922	4,083,030.17
1914	2,191,600.32	1923	3,782,712.04
1915	2,342,013.52	1924	3,755,956.57
1916	3,468,387.72	1925	3,887,239.22
1917	5,051,863.78	1926	3,924,891.95
1918	3,366,471.79		

Messrs. Price, Waterhouse & Co., chartered accountants, have examined the books of Canada Cement Co., L't'd., and their report shows that earnings from properties to be acquired by the new company, for the nine months ended September 30, 1927, available for bond interest and depreciation, were $3,714,884.37.

On the basis of these earnings for the nine months, the officials of the company estimate that the earnings for the completed 12 months ending December 31, 1927, will amount to $4,583,649; annual bond interest requirements (this issue), $1,100,000.

Assets.—Fixed assets, including plants, buildings, equipment, land, gypsum and limestone reserves, have been examined by Ford, Bacon & Davis, Inc., engineers, New York, who in their certificate of October 13, 1927, have appraised the commercial value of these properties, exclusive of working capital, at $38,267,500. In addition, according to the annexed balance sheet, certified by Messrs. Price, Waterhouse & Co., chartered accountants, the new company will have investments totaling $4,057,651 and net current assets and advances to subsidiary companies (after deducting all current liabilities) of $4,718,748.

Markets.—Owing to favorable plant location, the business is in a position to make prompt deliveries to its customers and to take full advantage of the increasing demand for cement that has developed because of the wider recognition of the numerous purposes for which it may advantageously be used. In addition to the extensive consumption of cement for such familiar purposes as construction of roadways, sidewalks, power dams, office buildings, hotels, etc., more than 50% of the cement consumed in Canada is used for other purposes in rural areas. In addition to its domestic trade, the business enjoys an extensive export trade with approximately 25 countries.

The following table indicates approximate consumption of cement in Canada:

Year	Barrels	Year	Barrels
1900	663,942	1922	6,549,749
1905	2,265,249	1923	7,067,535
1910	5,103,285	1924	7,372,524
1915	5,709,222	1925	7,140,531
1920	5,849,276	1926	8,442,203
1921	5,519,357		

In 1905 Canada exported no cement, but imported more than 900,000 bbl.; in 1926 less than 30,000 bbl. were imported and approximately 275,000 bbl. exported.

Stock Ownership by Employes—In 1916 the company put into operation a policy of encouraging ownership by employes of preference and common shares, which have been sold to employes on the installment basis and at favorable prices. As a result, more than 65% of employes have become shareholders and there are now on deposit with trustees cash and securities having a value of more than $4,500,000 to provide for the continuance of this policy.

CAPITALIZATION

(Upon completion of organization

	Authorized	Outstanding
1st mtge. bonds (incl. reg. and debenture stock)	$30,000,000	$20,000,000
6½% sinking fund cum. preference shares	25,000,000	21,000,000
Common shares (no par value), shares	750,000	600,000

Arrangements have been made with the trustee under the deed securing the 6% first mortgage bonds of the Canada Cement Co., Ltd. (old company), for the release of the mortgaged premises, the payment and satisfaction of all bonds in accordance with the terms of the trust deed having been duly and effectually provided for.

STATEMENT OF ASSETS AND LIABILITIES

(As at September 30, 1927)

ASSETS

Properties, as valued by Messrs. Ford, Bacon & Davis, Inc., New York		$38,267,500.00
Investments in subsidiary companies		4,057,651.42
Advances to subsidiary companies	$1,933,291.08	
Currents assets	4,929,216.74	6,862,507.82
Represented by		
Inventories	$2,625,981.94	
Insurance, etc., paid in advance	78,686.85	
Accts. rec., less res. for bad and doubtful debts	1,923,657.77	
Deposits on tenders and other assets	197,357.27	
Cash	103,532.91	
	$4,929,216.74	
		$49,187,659.24

LIABILITIES

1st mortgage bonds, authorized $30,000,000; issued, 5½%, Series A	$20,000,000.00
6½% sinking fund cum. preference shares (authorized $25,000,000)	21,000,000.00
Common stock: Surplus of assets over liabilities represented by 600,000 shares of no par value	6,043,900.00
	$47,043,900.00
Current liabilities: Accounts payable and accrued liabilities	2,143,759.24
	$49,187,659.24
Canada Cement Co., Ltd., has deposited with trustees for the purposes of the employes' stock distribution plan cash and securities having a market value in excess of	$4,500,000.00
And also cash and securities for the pension fund having a market value in excess of	400,000.00
Total	$4,900,000.00

These securities are not included in the above statement of assets and liabilities.

So favorable has been the reception accorded the recent offering of the issue of $20,000,000 Canada Cement Co., L't'd., first mortgage sinking fund 5½ per cent gold bonds, that the underwriting syndicate has been dissolved already. The dissolution of a syndicate within one week of the offering of the bonds, particularly when financing of such magnitude is involved, is regarded as being quite unusual, and is taken to indicate the high public regard in which Canada Cement securities are held by investors.

Dewey Cement Earnings

THE Dewey Portland Cement Co. for the first three quarters of 1927, had profits of $545,404. Net before bond interest for the period was $635,404 and gross totaled $2,037,085. Its net earnings for 1926 were $656,821 or five times interest requirements.

Monthly revenue this year has shown a gain each successive month.

Structural Gypsum Sells Stock

THE Structural Gypsum Corporation has sold privately $750,000 of its Class A preferred stock at par. The stock will not be offered to the public. The proceeds of this financing will be used for the expansion of manufacturing facilities, additional working capital and other corporate purposes.

U. S. Gypsum Moves 5⅛ Higher on Rumors of Stock "Melon" Action

UNITED STATES GYPSUM CO. was the outstanding feature of Chicago stock trading recently, with a jump of 5⅛ to 104⅛, after a turnover of about 8300 shares. The movement was attributed to pool action accompanied by rumors that the directors will follow the custom of the last year or two by declaring a stock dividend around Christmas. Directors will meet soon. The opinion in the street, however, was that if such action is taken it will be a small disbursement and may not exceed 5%.—*Chicago Journal of Commerce.*

Subsequently the directors met and declared a common stock dividend of 40 cents a share and an extra dividend of $1. The stock closed November 9 at 99½.

Omit North American Cement Preferred Dividend

DIRECTORS of the North American Cement Co. recently omitted the quarterly dividend of $1.75 a share on the preferred stock, due at this time. In his letter to stockholders President F. W. Kelley stated that the directors considered it desirable to retain the cash reserves for the present, rather than disburse them as dividends.

Pacific Lime & Plaster Co. Bonds Offered

BRADFORD, KIMBALL & CO., San Francisco, Calif., are offering $185,000 of first mortgage (closed) 7% sinking fund gold bonds of Pacific Lime and Plaster Co., San Francisco, Calif. Price 100 and accrued interest, to yield 7%. Dated July 1, 1927. Due July 1, 1942.

The following data are from a letter from Charles M. Cadman, president of the company:

Business.—Company has been engaged in the manufacture and sale of lime and lime products since 1906. Company has high calcium limestone deposits of excellent quality and a modern and completely equipped manufacturing plant of 13 kiln capacity located on the main line of the Sierra Ry. at Sonora, Calif. The deposits of lime in the Western States of a quality suitable for industrial and chemical uses are very limited in number and the company's deposits at Sonora are recognized because of their uniform quality and purity. The company also owns a completely equipped manufacturing plant located approximately in the center of the above deposit. The plant is modern and includes 13 upright steel kilns, oil fired under steam pressure. A new lime rock grinding plant, having a Williams hammer mill, is in continuous operation for all spalls or small stone too fine for burning or reclaiming and ground for the glass industry, agricultural stone, etc. A lime grinding plant having a Williams hammer mill pulverizes lime to forty mesh. A Clyde hydrating plant of the most recent and superior type is in operation closely adjoining the kiln house where quick or burned lime is hydrated under chemical control and where air separation of the finished product is accomplished by means of Raymond air separators. A Bates patent bagging machine (4-bag type) is used for bagging, thus handling the finished hydrated lime at a very low cost. Warehouses, tramways, blacksmith, machine and carpenter or barrel shops are all in up-to-date order. A complete chemical laboratory and offices are located at the plant. Company produces about 40% of the lime burned in the State of California. The high quality of its limestone deposits has brought the company a large share of the lime business of the State of California, and has made it possible to ship as far afield as Manila, P. I., the Hawaiian Islands, Peru, Costa Rica, Nicaragua, Guatemala, and into the States of Nevada, Oregon and Washington. Company's main distribution is to the building, leather, sugar, steel, glass, mining, fruit, oil and chemical industries.

Company owns approximately 113½ acres near Sonora, Tuolumne County, Calif. Company's limestone deposits are estimated by Frank H. Probert, Dean of the College of Mining, University of California, to have a total tonnage of 7,000,000 tons. The total marketable tonnage is 4,700,000 tons, which would give a life of 55 years to the project under the present scale of operation.

Security.—Direct obligation of company and secured by a first (closed) mortgage deed of trust on all real property, improvements, plant and equipment now or hereafter owned. Improvements, plant and equipment at Sonora have been independently appraised by the General Appraisal Co. and show a replacement value of $254,671 and total depreciated value of $213,343 as of Dec. 29, 1926. An appraisal of the limestone deposits and quarry has been made by Dean Probert, who places a valuation thereon of $695,456. The total valuation, therefore, of the security directly pledged aggregates $908,800, which is equivalent to nearly $5,000 for each $1,000 bond in fixed assets.

Earnings.—For the four years ending December 31, 1926, the gross sales and net income as shown by an audit of William Dolge & Co., certified public accountants, are as follows:

	Gross Sales	Net earnings before deprn., interest and Fed. income tax
1923	$291,282.67	$61,279.45
1924	275,060.63	53,901.14
1925	318,181.45	*31,959.59
1926	421,862.34	75.514.50
1927 (5 months)	186,919.43	34,283.28

*Note: The reduction of net in 1925 is due to an abnormally large expenditure for advertising during this year.

PACIFIC LIME AND PLASTER CO.
(Balance Sheet as of July 31, 1927)

ASSETS

Cash on hand and in bank		$ 11,115.39
Accounts receivable		69,019.14
Notes receivable		13,125.00
Inventories at cost		36,889.40
Total current assets		$ 130,148.93
Plant and equipment, depreciated		216,043.45
At Sonora—Appraised as of Dec. 31, 1926	$254,671.60	
Less depreciation	41,327.74	
Depreciated value, Dec. 31, 1926	$213,343.86	
At Sonora—Addns. to July 31, 1927	5,443.46	
At San Francisco and Los Angeles, July 31, 1927	5,915.13	
Total	$224,702.45	
Less depreciation, Jan. 1 to July 31, 1927	8,659.00	
Limestone deposits as Sonora, as appraised		695,456.14
Stocks owned		75,500.00
Due from allied concerns		32,434.50
Notes receivable	$60,434.50	
Less notes payable	28,000.00	
Cash surrender value of life insurance policies		2.007.50
Prepaid insurance, taxes, etc.		1,927.45
		$1,153,517.97

LIABILITIES AND CAPITAL

Current liabilities, accts. payable		$ 38,126.05
First mtge. (closed) 7% sinking fund gold bonds		185,000.00
Total liabilities		$ 223,126.05
Capital—Net worth		930,391.92
Common stock issued (Authorized $250,000)	$164,800.00	
Preferred stock issued (Authorized $250,000)	20,500.00	
Surplus	745,091.92	
		$1,153,517.97

Sinking Fund.—Indenture provides for annual sinking fund payments in an amount sufficient to redeem all of the bonds of this issue prior to maturity. The schedule of payments provides for annual retirements commencing July 1, 1928, in an amount of $5,000 with increasing amounts each year thereafter until July 1, 1942, with final payment on that date of $20,000.

Purpose.—Proceeds are to be applied to the payment of indebtedness. Company is engaged in a program of enlargement along constructive lines and these plans should result in substantial operating economies in the future and enlarging markets for the company's products.

Krauses Buy Zenith Limestone Company, Oklahoma

E. J. KRAUSE and C. H. Krause, president and vice-president, respectively, of the Columbia Quarry Co., St. Louis, Mo., have purchased the Zenith Limestone Co. operation, Tulsa, Okla. A detailed description of this operation was published in ROCK PRODUCTS, July 10, 1926.

The operation is notable for the operating problems it has presented and the unusual methods adopted in meeting them. The limestone formation rests on an inclined bed of shale, which has introduced blasting problems. Natural gas at 75-lb. pressure was used to operate the tripod drills, at the time the editor visited the quarry in 1926. The operation was also unique in the use of flat cars and a plow unloader for handling the stone from quarry to crusher. Stripping is done by hydraulic methods.

E. J. Krause informs ROCK PRODUCTS that he has purchased a Bucyrus 50-B electric shovel, two 8-ton Plymouth gasoline locomotives, and is in the market for 15 dump cars (6-yd.). A new crusher of oversize, elevator, screens and bins will be added also. Other changes and improvements will also be made.

The new company is officered as follows: E. J. Krause, president; C. H. Krause, vice-president; W. D. Ege, Tulsa, Okla., secretary; P. G. Forman, engineer-manager; and Pasqualle Giani, superintendent.

Limestone Deposits at Perry, Georgia, to Be Developed

THE Commercial Limestone Co., of Ocala, Fla., will open a plant on Limestone Ridge, three miles east of Perry, Ga., in the near future. Through E. B. Weatherly, of Macon, the company has acquired a large tract of land on the ridge, as follows: from Beckham Brothers, 200 acres; Bair and Evans, 100 acres; J. W. Bloodworth, 25 acres.

In addition to limestone lands, the company has secured a right-of-way for an extension of Central of Georgia railway tracks to the ridge from Perry. It is reported that construction of the spur track will begin at once, and erection of the quarrying and crushing plant will follow, to be ready for operation by January 1.—*Macon* (Ga.) *News.*

Standard Asphalt Corporation Buys Niagara Stone Products Company

THE Standard Asphalt Corporation, with headquarters in Cleveland, Ohio, through their representative, W. P. Benjamin, vice-president, has purchased the Niagara Stone Products Co.'s plant, located on the Bellefontaine-Huntsville pike, west of Bellefontaine, Ohio.

Mr. Benjamin says the company will spend $85,000 for new equipment, $30,000 of which will be for the crusher equipment and the remaining $55,000 for the asphalt plant.

The Standard Asphalt Corporation are manufacturers of patented asphalt. The stone is required in their extensive operations.

Mr. Benjamin stated that he had given the promise of the company to Hamilton Brothers (former owners of the Niagara Stone Products Co.) that the corporation would lay three types of pavement each around a block in Bellefontaine, the material to be furnished free, of the kind of patented pavement his company puts down. The Standard Asphalt Corporation operates in all of the middle western states, and as far north and south as Canada and the Mexican border, respectively.—*Bellefontaine* (Ohio) *Examiner.*

An Old Friend Heard From!

THE LETTER reproduced below, from A. P. Sandles, former secretary of the Ohio and National Crushed Stone Associations, we think ought to be shared with his many friends and acquaintances who read ROCK PRODUCTS, and who used to enjoy his very original and entertaining letters. It is good news that Mr. Sandles is rapidly recovering from a rather serious illness; and it is typical of the man—as all who know him will appreciate—that he has maintained his customary cheerfulness and "pep" even when confined to his bed. He has our sympathy, admiration and good wishes, as we are sure he has yours. Mr. Sandles is a director of the Federal Land Bank of Louisville, Ky., and is active in numerous farm organizations in Ohio. He has always taken pride in the fact that he is a "dirt" farmer.

THE FEDERAL LAND BANK
OF LOUISVILLE
620 SOUTH THIRD

OFFICERS & DIRECTORS
JAMES B DAVIS, PRESIDENT
H A SOMMERS, VICE-PRESIDENT
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DISTRICT NO. 4
TENNESSEE
KENTUCKY
INDIANA
OHIO

LOUISVILLE, KY.

Ottawa - Ohio
Oct 29 - 1927
**********.

The Colonel
****

-- received -
yours - recent date - mighty fine
of you to send greetings - only you
ought to be scolded for waiting
until a fellow is in bed

Mr.
Nathan C
Rockwood
****

-- am serving an
indoor sentence - rest-cure - had
been going too rapid pace - banquets
in four states, sleeper berths and
speeches

The
Editor
Manager
Rock Products
****

-- have republican
doctor - he prescribed skimmed milk
diet - have investigated and found
that he prescribes cream for his
G. O. P. patients

Chicago,
Illinois
****

-- have had all sorts
of good-will offerings - posies -
fruit - nuts - cake - candy and a
peck of onions - onions a good tonic -
they practically cured me

-- had little heart
troubled - induce by gall duct hesitation - the dam has been removed -
too much gall was the comment of a
gravel man - my wife agrees with him

-- am to be in New York -
December 5-6-7 - glad your Manufacturer's
Division of the N. C. S. A. is going good

-- thanks
-- respectfully

A. P. Sandles

ADDRESS ALL CORRESPONDENCE TO THE FEDERAL LAND BANK OF LOUISVILLE, NOT TO INDIVIDUALS

Sand and Gravel in 1926

BELOW is given the estimate of the United States production of sand and gravel for 1926 as compiled from producers' reports by the Bureau of Mines, Department of Commerce. It is interesting to note that the total of 183,100,818 tons varies from ROCK PRODUCTS' estimate of 192,000,000 tons, published in the Annual Review number, issued December 25, 1926, by only 4½%. ROCK PRODUCTS' estimate was made by its editors from a system of weighted averages applied to the reports of typical producers, who answered the questionnaires sent them. Such a method cannot be exact, but experience shows that it is exact enough for an estimate of yearly production made before many producers had closed their books for the year and who had therefore only estimates instead of exact figures to offer.

The Bureau of Mines condensed report follows:

Sand and Gravel Production Reaches Enormous Figures

The production of sand and gravel in this country in 1926 amounted to 183,100,818 short tons, valued at $111,338,701, according to the United States Bureau of Mines, Department of Commerce. Sand production was 92,114,279 short tons, valued at $55,675,988; gravel production was 90,986,539 short tons, valued at $55,662,713. Some idea of the enormous yearly output of the sand and gravel producers of the nation may be obtained by the realization that the 1926 production, which totaled more than 130,000,000 cu. yd., represents the volume of a ditch 1 yd. wide and 1 yd. deep extending three times around the earth. While considerable quantities of sand were used in glass making, in foundry work, for grinding and polishing purposes, for water filtration and for helping locomotives get under way, the great bulk of production was used for building and paving purposes, furnishing another evidence of the great construction boom now in progress. More than two-thirds of the gravel production was also used for building and paving purposes.

New York, with a production of 19,334,360 short tons, valued at $11,585,652, led all the states in sand and gravel production. Illinois, with an output of 17,777,169 short tons, valued at $8,714,350, ranked second, while Michigan, with an output of 14,398,338 short tons, valued at $7,265,161, was third.

SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN THE UNITED STATES IN 1926, BY STATES

State	Short tons	Value
Alabama	2,417,161	$1,245,210
Arizona	392,351	113,906
Arkansas	1,529,484	847,579
California	13,164,670	8,820,047
Colorado	764,523	590,695
Connecticut	1,059,556	451,069
Delaware	83,325	61,186
District of Columbia	561,688	583,080
Florida	1,841,009	1,483,757
Georgia	839,459	343,322
Idaho	225,345	58,985
Illinois	17,777,169	8,714,350
Indiana	12,009,308	5,194,448
Iowa	2,694,751	1,569,006
Kansas	2,489,343	1,491,492
Kentucky	3,214,487	2,234,586
Louisiana	2,689,840	1,784,315
Maine	491,260	220,931
Maryland	3,467,211	3,115,454
Massachusetts	2,969,172	3,276,787
Michigan	14,398,338	7,265,161
Minnesota	3,271,884	1,913,708
Mississippi	1,952,783	871,638
Missouri	4,611,952	2,980,242
Montana	935,443	313,268
Nebraska	2,134,452	1,124,764
Nevada	515,267	205,583
New Hampshire	708,098	731,639
New Jersey	4,455,412	3,576,320
New Mexico	128,577	86,805
New York	19,334,360	11,585,652
North Carolina	1,630,789	968,021
North Dakota	653,950	240,525
Ohio	11,716,926	7,840,316
Oklahoma	1,556,175	978,590
Oregon	2,568,730	1,530,794
Pennsylvania	12,873,953	11,695,218
Rhode Island	381,856	90,538
South Carolina	513,698	231,802
South Dakota	2,013,350	286,591
Tennessee	2,254,350	1,751,336
Texas	5,383,450	3,187,662
Utah	1,100,918	227,574
Vermont	141,554	25,535
Virginia	1,791,198	1,225,693
Washington	3,910,577	1,704,234
West Virginia	2,563,113	3,095,743
Wisconsin	7,977,261	3,264,271
Wyoming	941,292	139,273
	183,100,818	$111,338,701
Average value		$0.61

1927 A. S. T. M. Specifications Published

THE 1927 Tentative Specifications of the American Society for Testing Materials has just been published and is ready for distribution. The book includes a number of new specifications for cement, lime, gypsum and concrete aggregates. Several new specifications for broken stone for highway work are also noted. Minor revisions of the specifications for cement, concrete sewer pipe, and lime are listed, as also are revisions on the use of slag for highway construction. No other revisions were noted.

Sectional Committee on Testing Road Materials Organized

THE American Society for Testing Materials is sponsor under A.E.S.C. procedure for the development of standard methods of test of road and paving materials. It has formed a sectional committee on this subject by adding to the personnel of Committee D-4 on Road and Paving Materials officially appointed representatives of a number of organizations, some of which have been informally represented for some time and others of which have not been heretofore represented officially. The associations that are now formally represented on the committee are: American Association of State Highway Officials, American Concrete Institute, American Electric Railway Association, American Petroleum Institute, American Road Builders Association, American Society of Civil Engineers, American Society for Municipal Improvements, Asphalt Association, Associated General Contractors of America, Eastern Stone Association, Granite Paving Block Manufacturers Association, National Sand and Gravel Association, National Crushed Stone Association, National Paving Brick Manufacturers Association, National Slag Association, Portland Cement Association, U. S. Bureau of Public Roads, and U. S. Bureau of Standards. The committee contains 80 members, classified into producers, consumers and general interests.

The personnel has been submitted for approval of the American Engineering Standards Committee. When such approval has been given the committee will take up consideration of submission of existing methods for approval by the A.E.S.C. as American Standard, including revisions that have been made since original approval by the A.E.S.C. as Tentative American Standard of the Standard Methods of Test for Penetration of Bituminous Materials (D5 - 25) and the Tentative Method of Test for Distillation of Bituminous Materials Suitable for Road Treatment (D 20 - 27 T).

Rumors of Cement Project Near Sandusky Put to Rest

WITH the announcement by Attorney Oscar J. Horn of Cleveland of the incorporation of the Great Northern Stone Co. of Sandusky, Ohio, with a capital of $500,000, Sandusky business interests declared they "saw through" recent mysterious buying of farm lands with stone underlying south and southwest of Sandusky. Mr. Horn admitted that some of the land had been bought for his company as did William P. Reile of Upper Sandusky, a banker, in whose name 350 acres had been purchased. The new company will take over among other premises the lands and quarries of the Lake Shore Products Co.—*Shelby* (Ohio) *Globe*.

SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN THE UNITED STATES, 1925-1926

Use	1925 Short tons	1925 Value	1926 Short tons	1926 Value
Sand:				
Glass	2,334,921	$3,836,085	2,274,218	$3,615,371
Molding	4,995,428	5,400,618	5,309,166	5,630,799
Building	45,287,240	26,306,463	45,327,512	24,891,475
Paving	24,876,814	13,659,228	27,476,998	14,970,906
Grinding and polishing	1,824,449	2,525,180	1,859,215	2,504,514
Fire or furnace	343,716	392,932	434,541	460,967
Engine	2,261,635	1,395,890	2,355,399	1,440,626
Filter	106,462	249,141	79,382	169,299
Other*	5,151,557	1,382,788	6,997,846	1,992,031
	87,182,222	$55,148,325	92,114,279	$55,675,988
Gravel:				
Building	32,759,151	$24,589,689	30,535,396	$22,701,685
Paving	32,574,570	21,411,672	38,319,064	25,445,025
Railroad ballast†	19,485,530	6,392,437	22,132,079	7,516,003
	84,819,251	$52,393,798	90,986,539	$55,662,713
Grand total	172,001,473	$107,542,123	183,100,818	$111,338,701

*Includes some sand used for railroad ballast and fills.
†Includes some gravel used for fills by railroads.

Foreign Abstracts and Patent Review

Researches on High Alumina Cements. Interesting researches on this subject were conducted at the research laboratory at Boulogne-sur-Mer by R. Feret. The discoloration and failure of this cement in a concrete structure erected in the summer of 1926 using sea water as mixing water, and placing the concrete during very hot weather, the structure being partly under water, were investigated.

A sample of this cement was sent to the author. However, as it was stored for some time on the job, it had changed considerably due to moisture and contained a good many fair sized lumps, some of which had already acquired considerable hardness. Identical tests were made of other alumina cements. Due to the deficiency of the samples, nothing definite could be established by these tests with respect to the job.

However, the fact that in most of the laboratory tests, the different samples of alumina cement showed no such effect as was apparent on the job, cast a certain suspicion on the quality of the job cement, which may have had a slightly too low alumina content or may have been in an abnormal oxidization due to some accident of manufacture.

The curing medium of mortars appeared to have no important effect, as long as sufficient moisture was assured. The use of sea water as mixing water has sometimes resulted in retarding the set and has generally greatly decreased the strength. Further tests on a greater number of samples are necessary to clear the latter point. In the meantime, it is advisable to avoid mixing alumina cements with sea water as much as possible. The weathering of cements retards their set and reduces their strength, but seems not to have entered in the conditions studied.

Finally, the high temperature of the materials and of the atmosphere during the execution of this work followed by a period of drought must have had a most important effect, facilitating evaporation of a large part of the water indispensable for the hydration of the active elements of cement.

Whatever the reason, the different precautions necessary wherever alumina cements are used, should not be neglected. The most important of these is to prevent their drying during hardening. The best means of accomplishing this consist in avoiding the use of too much cement in the mix, in mixing to soft consistency, in using small amounts to avoid excessive rise of temperature, in moistening the forms before depositing the concrete and finally in maintaining certain conditions of moisture by sprinkling the concrete until such time, when it acquires a definite strength.—*Revue des Materiaux de Construction* (1927), 265-268, 307-310.

Treatment of Calcareous Road Materials with Silicate of Soda. Good results have been obtained in France during the last few years by impregnating the calcareous materials of a roadbed with sodium silicate. A very effective compacting of the wearing surface is thus achieved, permitting the use of local materials, which would otherwise be considered inadequate for road construction.

It was in 1841 that Kulhmann pointed out for the first time the great increase in hardness communicated by alkaline silicates to porous calcareous rocks.He explained this phenomenon by a double reaction, producing a lime-silico-carbonate more resistant than the carbonate itself.

Since that time other hypotheses have been advanced, and it was the purpose of the tests here described to further elucidate this question.

A solution of sodium silicate introduced into milk of lime produces the precipitation of lime silicate, soluble in an excess of alkaline silicate. The same reaction takes place when a mortar is mixed with a solution of silicate at 36 deg. Beaume and powdered hydrated lime: partial setting takes place during mixing. This explains why cement during hardening may be compacted by a coating of alkaline silicate, forming calcium silicate with the lime hydrate set free during the setting of cement.

When finely powdered chalk, marble, quartzite, dry clay or charcoal are treated in the same way no similar hardening results. Such pastes, exposed to air, harden rapidly along the surface, while their interior remains soft for some time.

Numerous tests were made to study the effect of sodium silicate under different conditions. The following conclusions were drawn: the hardening of rocks treated with sodium silicate seems to be due mainly to the separation of gelatinous silica, which later coagulates, enfolding the particles of rock in a resistant and insoluble magma. The main factor influencing this process is the adsorption exercised by different solids in a divided state, regardless of the nature of these solids. Drying, dialysis and the action of carbon dioxide of the air may exercise a favorable influence in this connection. Due to the variation of these influences, the results obtained in the tests show wide variations.—*Rev. des Mat. Constr.* (1927), 300-304.

Artificial Marble. A solution containing zinc and magnesium sulphates in definite proportions is treated in a colloid mill with vaseline oil and phenol-formaldehyde condensation products. The viscous colloidal product is made slightly acid with sulphuric acid and added to a mixture of magnesia with water and a suitable filler, such as barium sulphate.—*English Patent No.* 275,448.

Bituminous Concrete. A cementitious powder, consisting of a mixture of a true cement with stone or slag flour, with or without the addition of oxide of iron, is mixed with a mineral aggregate and with a bituminous soap prepared by saponifying a mixture of bituminous material and a vegetable oil.—*English Patent No.* 275,364.

Enameling Articles Made of Fibrous Cement. The well-dried article from which all grease has been removed is covered with a thick paste made by mixing stannic oxide, cryolite, and a pigment with powdered flux and water, and, after drying, the article is heated until the flux melts. The flux is made by melting together silica, red lead, borax and nitre, with subsequent grinding to an impalpable powder.—*French Patent No.* 610,956.

Recent Patents on Sand-Lime Brick Manufacture. J. Thamm has compiled the following abstracts of recent patents granted in Europe and the United States.

Process for the Hydration of Hydraulic Lime. Slaking proceeds at higher temperatures than the temperature naturally developed during slaking. This is accomplished by admitting hot gases to the lime in one or several hydrators. *H. Spoerrl, Swiss Patent No.* 106,952.

Process and Device for the Production of Milk of Lime by Mechanical Means. A revolving, perforated drum containing lime is alternately immersed in a barrel of water and lifted out. During each immersion the lime which comes in contact with the water becomes hydrated. Subsequent immersion results in the formation of milk of lime. The drive of the swinging lever operating the drum is connected mechanically to that supplying the rotary motion to the drum. *F. Kommick Machine Co., German Patent No.* 398,462.

Hydrating of Lime for Milk of Lime. The patent deals with production of milk of lime on a large scale, as, for example, in recovering the byproducts in coke plants or in driving off ammonia compounds from gas solutions. To obtain large outputs with simple means and low power consumption, at the same time obtaining pure milk of lime, hydration and subsequent purification of the lime is effected in settling basins similar to those used in washing coal. The lime is dumped into basins with sieve bot-

toms. Water and lime are agitated in a vertical direction by special horizontal paddles or by moving the bottom of the basin and the milk of lime separated from the rock effectively. *German Patent No.* 398,-917.

Slate-Lime Material. Ninety parts of slate ground to the fineness of cement are mixed with 10 parts hydrated lime and 200 to 300 parts water in the Plauson colloid mill or in a similarly acting swift dispersion machine in the presence of 0.1 part rubber glue as a protective colloid. The mixing proceeds for 3 to 10 minutes, whereupon the mixture is reduced to a plastic mass of 15 to 25% water content by means of a centrifuge or similar machine, pressed into boards and allowed to harden in drying kilns in the presence of steam and 3 to 5% carbon dioxide and at a pressure of about 8 atmospheres for 4 hours. The final product can be used for making electric switchboards, insulators, writing tablets, roofing shingles, floor boards and brick. *German Patent No.* 396,779.

Building Block From Quarry Wastes. Argillaceous limestone is mixed with 50 to 80% ground rock representing the quarry waste and with 8 to 10% hydrated lime and worked up by the usual sand-lime brick process. The resulting product resembles the natural stone in texture, presents a smooth surface, has low porosity and high resistance to wear. *French Patent No.* 578,044.

Treatment of the Sand-Lime Mixture. To make sure that all lime in the mix becomes hydrated, the mass is introduced with water into a revolving autoclave and steam under pressure admitted. *French Patent No.* 599,918.

Lightweight Sand-Lime Building Block. The mix worked in accordance with the sand-lime brick process consists of kieselgur

Manufacture of Artificial Hydraulic Limes. Lime, just drawn from a kiln and still hot, is mixed with wet trass or other wet volcanic tufas, wet slag or wet cinders under steam pressure and the mixture is ground also under steam pressure. The cementing power is increased further by heating the mass to drive off the water of hydration. *German Patent No.* 428,431.

Improvement of Mortar Finishes. In preparing the mortar mixture, an acid constituent is added, which is harmless, such as acid salts (ammonium bicarbonate, calcium bicarbonate, calcium phosphate) or active silica. This is particularly valuable where coloring matter is used, as the process preserves the color. *German Patent No.* 423,346.

Molding Machine for the Manufacture of Art Stone. The upper part carrying the pressure head is supported by columns over the lower part containing the molding frames. The upper part also contains the entire arrangement supplying motion to the molds, which consists of two beams carrying the frame, connected left and right to a roller, the machine being made safe from clogging. *German Patent No.* 405,231.

Molding Block Machine. The upward motion of the head is limited to a level corresponding to the depth of the block desired. The shock resulting from the stopping of the head is absorbed by a bumper connected to the molding frame, capable of vertical adjustment, the depth of block remaining unchanged for different positions of the frame. *German Patent No.* 421,109.

Block Machine. The vertically moving pressure head is connected to two revolving double levers, whose arms pointed outward are provided with counterweights balancing the weight of the head. These arms are made of two sliding members adjustable for every position. *German Patent No.* 421,193.

Manufacture of Cement, Lime or Gypsum Products. According to D. R. P. 418,708, ceramic products are densely compacted by subjecting them upon molding to a uniform pressure from all sides while immersed in a gaseous, liquid or other medium in a tightly closed space. The same process can be applied to gypsum, lime, cement products, etc. The products acquire high strength in a short time of pressure application. *German Patent No.* 421,423.

Molding Machine for Fine Ground Mixtures. The motion of the pressure head is produced by a vertically moving clamping device, set in operation by a lever, which clamps the rod of the head. The lever, moving upwards, lifts two ties by means of tensile rods and one cross piece. These ties transmit a rotary motion to the clamping jaws eccentrically located on another cross piece. The eccentric connection causes the jaws to clamp the rod, as the rotation continues, and lift it in the upward course. *German Patent No.* 423,927.

Molding Machine for Sandy and Granular Substances. The vertically moving mold, as well as the mold filling and tamping devices, are connected with a shaking arrangement for the mold by a common drive shaft, in such a way that an automatic succession of filling the mold, shaking the mold and tamping is produced. *German Patent No.* 435,129.

Drive for a Rotary Press. The patent refers to heavy machinery such as sand-lime-brick presses, called upon to furnish large outputs and exposed to great wear. A pinion gear at the flange of the revolving table is set in motion by a spur gear revolving in the same direction. The latter is operated by another gear located along its axis. The latter transmits a straight line motion to a number of bolts fitting into corresponding openings at the inner circumference of the spur gear. The housings of both gears are made as long as possible to secure accurate adjustment of the two gears for a long time. The driving power is distributed uniformly over the circumference of the spur gear. *German Patent No.* 435,461.

Rotary Block or Sand-Lime Brick Press. To obviate using heavy and bulky castings, the installation consists of individual C-shaped plates connected by cross pieces. These C-shaped plates can be cut of good grade tin without any difficulty and are capable of withstanding the entire pressure. The cross pieces provide sufficient bracing to take up horizontal stresses. The press is very light and has small dimensions, so that it can be completely assembled before it leaves the shop and can be shipped in this condition. The axis of the rotary press is clamped between the upright bases and serves as an anchor, taking part in carrying stress and freeing the supporting frame of some of its load. *German Patent No.* 438,811.

Manufacture of Hollow Sand-Lime Brick. The process makes use of rotary presses with intermittent rotation. Solid lugs, which correspond to the ducts in the finished product, are inserted in the mass, when in a tightly closed mold. The pressure is applied in the direction of the lugs and the lugs are removed, the form remaining closed, and finally the block released from the mold. *German Patent No.* 441,158.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Manufacture of Hydrated Lime. The quicklime is slaked with an excess of water, so that it contains 50 to 90% water and its temperature slightly exceeds that of boiling water. Upon elimination of impurities, the excess water is filtered in special filters, and the lime, now containing 25 to 40% water, is stored in a silo, where it becomes completely hydrated through the gradual evaporation of excess water. *C. L. Chubbuck, U. S. No.* 1,580,710.

Lime Hydrating Process. A chute discharges onto a continuous belt and forms the outlet of a trough, which receives the burned lime. While passing through the trough the lime is thoroughly sprayed and is then permitted to fall through the chute on the continuous belt, so that the lumps become broken up and are thoroughly hydrated as the excess water evaporates. *M. Herman, U. S. No.* 1,462,234.

Manufacture of Sand-Lime Building Block. The sand-lime brick process is used with a mixture consisting of coarse, purified cinders, finely divided diatomaceous earth, hydrated lime and water. *W. H. Crume, U. S. Patent No.* 1,552,051.

34.5 parts, lime 18.5, cement 18.5 and sawdust 28.5, all parts by weight. The ingredients are combined in such proportions that the part by weight of kieselgur and sawdust is at least as high as that of cement and lime. Watertightness may be improved by the addition of resin, asphalt, tar, etc. An admixture of naphthalene and similar volatile substances results in porous light-weight block. *U. S. Patent No.* 1,521,813.

Traffic and Transportation

EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts), as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

	Limestone Flux Week ended		Sand, Stone and Gravel Week ended	
District	Oct. 8	Oct. 15	Oct. 8	Oct. 15
Eastern	3,063	3,289	16,621	16,219
Allegheny	3,711	3,945	11,131	11,352
Pocahontas	512	505	956	1,130
Southern	645	578	11,991	11,950
Northwestern	1,327	1,004	6,597	7,858
Central Western	536	560	10,142	12,347
Southwestern	460	484	5,971	6,434
Total	10,254	10,365	63,409	67,290

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1926 AND 1927

	Limestone Flux Period to Date		Sand, Gravel and Stone Period to Date	
	1926	1927	1926	1927
District	Oct. 16	Oct. 15	Oct. 16	Oct. 15
Eastern	140,918	428,995	141,597	4,358,884
Allegheny	160,871	316,027	149,368	322,877
Pocahontas	21,770	36,547	21,344	38,273
Southern	27,364	506,444	24,289	501,952
Northwestern	59,750	268,095	56,132	270,720
Central Western	20,863	376,239	21,129	384,452
Southwestern	12,153	215,208	14,471	226,153
Total	443,689	2,147,555	428,330	2,180,311

COMPARATIVE TOTAL LOADINGS 1926 AND 1927

	1926	1927
Sand, stone, gravel	*428,330*	*2,180,311*
Limestone flux	*443,689*	*2,147,555*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning November 5:

WESTERN TRUNK LINE DOCKET

6216 (reissued). **Limestone, agricultural** (for soil treatment), in boxes, barrels or bulk. Minimum weight 60,000 lb. Between stations on the C. M. & St. P. Ry. in Illinois and C. M. & St. P. Ry. stations in Iowa. Present and proposed rates for a few representative distances are as follows (rates in cents per net ton):

Dist.	Pres.	Prop.	Dist.	Pres.	Prop.
5 miles	70	60	125 miles	210	110
25 miles	100	60	150 miles	220	120
50 miles	130	74	175 miles	230	125
75 miles	160	90	200 miles	240	135
100 miles	180	100			

4742D. **Dust, stone,** carloads (See Note 2), but not less than 60,000 lb., from Centerville, Iowa, to Ottawa, Ill. Present rate, $2.70 per ton of 2000 lb. (crushed stone rate); proposed, $1.55 per ton of 2000 lb.

3089F. **Limestone, ground,** carloads, from Centerville, Iowa, to Twin Cities. Present rate, 20½c per 100 lb. (classification minimum weight); proposed, 17c per 100 lb., minimum weight 40,000 lb.; 15c per 100 lb., minimum weight 90% of marked capacity of car.

2898-E. **Sand and gravel,** carloads (See Note 3), (in no case shall the minimum carload weight be less than 40,000 lb.), between stations in Iowa and stations in Minnesota. Rates in cents per 100 lb.:

Miles	Pres.	Prop.	Miles	Pres.	Prop.
5	5	3½	100	9	5½
50	6½	4	125	10½	6½
75	8	5	140	10½	7

1376U—Rates and minimum weight: **Sand, silica, pumice, ash, volcanic,** carloads, from Powell, Colo.

	To—			
	Miss. Riv.	Peoria	Chicago	St. Paul
Present	29½	29½	29½	29½
Proposed	*22	*24	*24	*24

*Minimum weight 60,000 lb.

2035B. **Stone, crushed,** carloads (See Note 3), (in no case shall the minimum carload weight be less than 40,000 lb.), from Sioux Falls and Spencer, S. D., to Jamestown, N. D. Present—From Sioux Falls, 16½c; from Spencer, 18c per 100 lb. —(Combination of rates from Sioux Falls over Casselton; from Spencer over Oakes.) Proposed —From Sioux Falls and Spencer, 16c per 100 lb.

Note 1—Minimum weight marked capacity of car.
Note 2—Minimum weight 90% of marked capacity of car.
Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

CENTRAL FREIGHT ASSOCIATION DOCKET

16864. To establish on **sand and gravel,** carloads, from Anderson, Ind., to C. C. C. & St. L. Ry. stations present and proposed rates (in cents per net ton) from Anderson, Ind.:

To—	Pres.	Prop.	To—	Pres.	Prop.
Linwood	65	60	Speicher	90	85
Alexandria	65	60	Urbana	90	85
Summitville	75	65	Bolivar	90	85
Fairmount	75	65	N. Manchester	90	85
Jonesboro	75	70	Silver Lake	99	95
Marion	75	70	Claypool	99	95
Fox's	85	75	Warsaw	104	95
La Fontaine	85	75	Leesburg	104	100
Treaty	85	75	Milford	113	100
Wabash	85	80	Milford Jct.	113	100

16902. To establish on **sand and gravel,** carloads, Evansville, Ind., to Hepburn, Oliver and Springfield, Ind., 80c per 2000 lb., and to Solitude, Erwin and Mt. Vernon, Ind., rate of 85c per 2000 lb. Present rate, 92c per 2000 lb. to Hepburn, Oliver and Springfield and 95c per 2000 lb. to Solitude, Erwin and Mt. Vernon, Ind.

16903. To establish on **crushed stone,** carloads, Lima, Ohio, to Chillicothe, Richmondale and Slate Mills, Ohio, rate of $1.25, and to Wellston, Ohio, $1.35 per net ton. Present rate, $1.40 to Chillicothe, Richmondale and Slate Mills, Ohio, and $1.50 per net ton to Wellston, Ohio.

16905. To establish on **gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica, carloads, Winona Lake, Ind., to Culver, Ind., rate of 75c per net ton. Present rate, $2.60 per net ton.

16931. To establish on **crushed stone,** carloads, Melvine, Ohio, to Carbondale, Ohio, rate of $1.15 per net ton. Present rate, 17c.

16935. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel,** carloads, to Port Clinton, Ohio, from Pleasant Lake, Ind., rate of $1.15 per net ton, and from Tecumseh, Mich., rate of $1.04 per net ton. Present rate, $1.27 per net ton from both points.

16940. To establish on **crushed stone,** carloads, McVittys, Ohio, to Lathrop, Ohio (Federal Valley R. R.), rate of $1.45 per net ton. Present rate, sixth class.

16851. To establish on **sand,** carloads, Wapakoneta, Ohio, to Columbus Grove, Ohio, rate of 65c per net ton. Present rate, 80c per net ton.

16854. To establish rates on **limestone, agricultural** or marl (ground or natural), agricultural, carloads, minimum weight 50,000 lb., from Milford, Ind., on basis of 60% of sixth class to Central Freight Association territory as described in C. F. A. T. B. Tariff 130R and 70% of sixth class to Canadian territory. Present rates, sixth class.

16861. To establish on **sand, blast, engine, foundry, glass, molding or silica,** carloads, Conneaut Harbor, Conneautville, Ohio, West Springfield, Greenville, Henlein and Osgood, Penn., to N. Y. C. R. R. stations in New York, rates as per Exhibit "A" attached. Present rates—As per Exhibit "A" attached.

16862. To establish on **crushed stone,** carloads, Huntington, Ind., and Lima, Ohio, to points in Indiana and Ohio, rates as shown in Exhibit "B" attached. Present rates—As per Erie Railroad Tariff I. C. C. A6778.

EXHIBIT "A"

Rates on Sand, Blast, Engine, Foundry, Glass or Silica

To Stations	Proposed Rates From: Conneaut, Ohio Conneaut Harbor, O. Conneautville Ohio W. Springfield, Penn.	Greenville, Penn. Henlein, Penn. Osgood Penn.	Present Rate
	In cents per net ton		
To N. Y. C. R. R. Gasport, N. Y., to Middleport, N. Y.	239	251	340
Medina, N. Y., to Holley, N. Y.	259	271	340
Brockport, N. Y., to Elmgrove, N. Y.	269	281	340
Getzville, N. Y., to Brixment, N. Y.	229	241	340
Pembroke, N. Y.	239	251	340
East Pembroke, N. Y.	259	271	340
Alexander, N. Y.	239	251	340
Attica, N. Y.	239	251	340
Stafford, N. Y., to Golah, N. Y.	259	271	340
West Rush, N. Y.	269	281	340
Holcomb, N. Y., to Canandaigua, N. Y.	279	291	340
Model City, N. Y.	239	251	340
Ransomville, N. Y., to Burt, N. Y.	259	271	340
Appleton, N. Y., to Millers, N. Y.	269	281	340
Lyndonville, N. Y., to Greece, N. Y.	279	291	340
Charlotte, N. Y.	279	291	340
Barnhard, N. Y.	279	291	340
Rochester, N. Y.	239	251	340
Alton, N. Y., to Wolcott, N. Y.	389	301	340
Red Creek, N. Y., to Sterlin, N. Y.	319	331	340
Thompsons, N. Y. (Wayne Co.), to Mays Mills, N. Y.	289	301	340
Seneca Mills, N. Y., to Penn Yan, N. Y.	319	331	340
Dox, N. Y., to Corning, N. Y.	319	331	340
Rome, N. Y.	364	364	370

Waterloo, N. Y., to Relius, N. Y. West Shore R. R.	314	314	340
Macedon, N. Y., to Newark, N. Y.	291	279	340

EXHIBIT "B"

To	From Huntington, Ind. Pres.	Prop.
Simpson, Ind.	60	....
Markle, Ind.	60	....
Uniondale, Ind.	63	60
Kingsland, Ind.	63	60
Tocsin, Ind.	63	....
Magley, Ind.	69	65
Preble, Ind.	69	65
Decatur, Ind.	69	....
Rivare, Ind.	69	....
Wren, O.	70	....
Glenmore, O.	70	....
Ohio City, O.	88	75
Elgin, O.	88	85
Converse, O.	88	90
Spencerville, O.	88	90
Conant, O.	104	95
Kemp, O.	104	95
Lima, O.	105	95
From Lima, O.		
Kemp, O.	*60	....
Conant, O.	*60	....
Spencerville, O.	*60	....
Converse, O.	*60	....
Elgin, O.	*60	....
Ohio City, O.	*60	....
Glenmore, O.	*70	....
Wren, O.	*70	....
Rivare, Ind.	....	*75
Decatur, Ind.	....	*75
Preble, Ind.	....	*85
Magley, Ind.	....	*85
Tocsin, Ind.	....	*85
Kingsland, Ind.	....	*90
Uniondale, Ind.	....	*90
Markle, Ind.	....	*95
Simpson, Ind.	....	*95
Huntington, Ind.	....	*95

*Includes only $2.70 per car switching absorption at Lima.

16844. To establish on **agricultural limestone** or agricultural marl (ground or natural marl), carloads, minimum weight 50,000 lb., from Chicago Heights, Ill., a rating of 60% of sixth class to C. F. A. territory and 70% of sixth class to Canadian territory in connection with the B. & O. C. T. R. R. and its connections, also in connection with the E. J. & E. Ry. Present—Item 1200 of C. F. A. B. Trf. 130R provides for these ratings from Chicago Heights, Ill., on traffic moving via E. J. & E. Ry., also via B. & O. C. T. R. R. on shipments routed via C. & E. R. R. or via C. & E. R. R. and connections.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4144. **Sand (not molding nor silica) and gravel,** carloads, from Ottawa to Alexis, Ill. Present rate, 125c; proposed, 113c per net ton.

3222. **Sand,** carloads, from Ottawa, Ill., to Chattanooga, Tenn. Present, $4.98 per net ton; proposed, $4.50 per net ton.

4212. **Sand** (not molding, silicate) **and gravel,** carloads, from Louisiana, Mo., to Quincy, Ill. Present, Class "E"; proposed, 75c.

4226. **Sand and gravel,** carloads, from Fontana, Wis. (Present rates—Combination.) Rates in cents per net ton.

To	Prop.	To	Prop.
Mundelein, Ill.	75	Highland Park, Ill.	85
Niles Center, Ill.	75	Kenosha, Wis.	85
Waukegan, Ill.	85		

4201-A. **Sand and gravel,** carloads (See Note 1), from Chillicothe, Ill., to T. P. & W. Ry. stations, viz.: Leonard, Crescent City and Watseka, Ill. Rates in cents per net ton. Present, 115; proposed, 101.

4242. **Molding sand,** carloads (See Note 3), but not less than 40,000 lb., from Dallas City, Ill., to Urbana, Ill. Rates per net ton. Present, Class B; proposed, $1.50.

SOUTHERN FREIGHT ASSOCIATION DOCKET

36794. **Gravel,** from Johnsonville, Tenn., to Dyer, Tenn. Present rate, 154c per net ton. (Combination.) Proposed rate on gravel, carloads, usual description and minimum weight, from Johnsonville, Tenn., to Dyer, Tenn., 125c per net ton (intrastate only), made on basis generally used in constructing gravel rates between points in the south.

36829. **Sand, gravel, slag, etc.,** from Golden, Miss., to N. C. & St. L. Ry. stations in Tennessee. Combination rates now apply. Proposed rates on sand, gravel, crushed stone, slag, rubble stone, broken stone and chert, in straight or mixed carloads (See Note 3). (Rates in cents per net ton.) From Golden, Miss., to following stations in Tennessee:

Neely	125	Somerville	135
Denmark	125	Warren	135
Mercer	125	Oakland	135
Hatchie	125	Hickory Wythe	140
Vildo	125	Eads	140
Whiteville	125	Cordova	140
Laconia	135	Mullens	140

The suggested rates are made on basis of I. C. C. Docket 17517 Joint Line scale.

36908. **Limestone or marble, ground or pulverized,** from Buquo, N. C., to Washington, D. C. Class rates now apply. Proposed rate on limestone or marble, ground or pulverized, carloads, minimum weight 67,000 lb., except where marked capacity of car is less, in which event marked capacity of car will govern, from Buquo, N. C., to Washington, D. C., 276c per net ton, based on 60c per net ton higher than local mileage rate to Alexandria, Va.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

13242. **Molding sand,** carloads (See Note 3), from Brookview, Van Hoosen and Niverville, N. Y., to New York Central R. R. and West Shore R. R. stations, rates proposed same as published from B. & M. R. R. sand-shipping stations in their I. C. C. A2570, via B. & A. R. R., N. Y. C. R. R. or W. S. R. R. (Exhibit covering all points of destination and proposed rates will be furnished on request.) Reason—To equalize rates via competing route.

13244. **Molding sand,** from Saratoga Springs, Schuylerville, Wayville, N. Y., to West Duluth, Minn., 31½c, via standard all-rail routes as specified in Agent Frank Van Ummersen's I. C. C. 60. Reason—To place shippers on a parity with those at Brookview and Van Hoesen, N. Y.

13252. **Sand,** building, common or run of bank, carloads (See Note 2), from Northford, Conn., to Stamford, Conn., 4½c. Reason—To meet competitive conditions.

13253. **Sand, fire, sea or core,** carloads (See Note 2), from Provincetown, Mass., to Portland, Me., 15½c, via N. Y. N. H. & H. R. R., Concord Jct., Mass., B. & M. R. R. Reason—To provide commodity rate comparable with other existing commodity rates.

13262. **Limestone, crushed or ground;** limestone chips or waste, from West Rutland, Vt., via C. & P. R. R. to points on the New York Central R. R. (territory embracing stations on the Hudson, Mohawk, Syracuse, Rochester, Buffalo, Ontario, St. Lawrence, Adirondack (Index Nos. 462, 491 only) and Ottawa divisions of the N. Y. C. R. R. River, Mohawk, Syracuse and Buffalo divisions of the W. S. R. R.), rates and routing same as presently effective in connection with lime, common, hydrated, quick or slack to same destinations named in Rut. R. R. I. C. C. No. 5724. Reason—To permit movement of traffic.

TRUNK LINE ASSOCIATION DOCKET

16655. **Sand, molding, blast, engine, foundry, glass, silica, quartz or silex,** carloads (See Note 2), to Bristol, Penn., from Morrisville, Penn., 70c, Tullytown, Penn., 65c per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force to Wilburtha, Trenton, N. J., Easton and Odenwelder, Penn., as per P. R. R. G. O. I. C. C. No. 14628 and C. N. J. I. C. C. 2909.

16666. **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads (See Note 2), from Morrisville and Tullytown, Penn., to West Chester, Penn., $1 per ton of 2000 lb. Reason—To meet motor truck competition from Philadelphia, Penn., and Wilmington Del.

16672. **Sand, blast, engine, foundry, molding, glass, silica, quartz or silex,** carloads (See Note 2), from Masonville, N. J., to South Pemberton, N. J., inclusive, to Standish, N. Y., 24c per 100 lb. Reason—Proposed rate compares favorably with rates to Montreal, Que., as per P. R. R. G. O.-I. C. C. 14486.

16674. **Sand and gravel,** carloads (See Note 2), from Allegany and Vandalia, N. Y., to Olean, N. Y., 65c per ton of 2000 lb. Reason—To place shippers at Allegany and Vandalia, N. Y., on a comparable basis with shippers located at Machias, N. Y., as per P. R. R. G. O.-I. C. C. 14208.

16683. **Agricultural or land lime,** carloads, **minimum weight** 30,000 lb., and **ground limestone,** carloads, minimum weight 50,000 lb., from Ashcom, Penn., to P. R. R. points, New York lighterage, Brooklyn, N. Y., Jersey City, N. J., Trenton, N. J., Freehold, N. J., Camden, N. J., Toms River, N. J., Lancaster, Penn., Norristown, Penn., Duncannon, Penn., Altoona, Penn., Mt. Dallas, Penn., Cumberland, Md., Mahaffey, Penn., Punxsutawney, Penn., Josephine, Penn., Pittsburgh, Penn., Brownsville, Penn., Lewistown, Penn., and various. Rates ranging from 6c to 21½c per 100 lb. Reason—To place Ashcom on a comparable basis with rates in effect from Bellefonte, Penn., to the points as per P. R. R. G. O.-I. C. C. 14567.

16688. **Limestone screenings,** carloads (See Note 2), from Atlas, Hamburg and Lime Crest, N. J., to Schenectady, N. Y., $2.60 per ton of 2000 lb. Reason—Proposed rate is the same as published on limestone from and to same points as per L. & H. Ry. I. C. C. A1782.

16694. **Limestone, ground,** precipitated or **pulverized,** and **limestone dust,** in carloads, minimum weight 50,000 lb., from Atlas, Hamburg and Lime Crest, N. J., to Burlington and Montpelier, Vt., 19½c per 100 lb. Reason—Proposed rate compares favorably with rate now in effect to Richford, Vt., as per L. & H. R. Ry. I. C. C. A1789.

16700. **Lime, land,** chemical and hydrated chemical, carloads, minimum weight 30,000 lb., from Annville, Donaghmore, Hummelstown, Lebanon, Myerstown, Palmyra, Paxtang and Swatara, Penn., to Tacony, Penn., 11c per 100 lb. Reason—Proposed rate compares favorably with rates on like commodities from and to points in the same general territory as per P. R. R. G. O. I. C. C. 14567 and Reading Co. Tariff I. C. C. J8664 and I. C. C. 260.

16703. (A) **Gravel and sand,** other than blast, engine, foundry, glass, molding or silica, carloads; (B) **sand, blast, engine, foundry, glass, molding or silica,** carloads, from Daguscahonda, Penn., to Hallton, Penn.; (A) $1.15, and (B) $1.26 per ton of 2000 lb. Reason—Proposed rates compare favorably with existing rates from and to points in the same general territory as per P. R. R. G. O. I. C. C. 14198.

16710. **Limestone, agricultural,** dust, ground, precipitated or pulverized, in carloads, minimum weight 50,000 lb., from Jordansville, N. Y., to N. Y. O. & W. Ry. stations, rates ranging from 9½c to 16c per 100 lb. Reason—Proposed rates are comparable with rates now in effect from Syracuse, N. Y., to N. Y. O. & W. Ry. stations as per D. L. & W. I. C. C. 21956.

16715. **Sand** (other than blast, engine, foundry, glass, molding and silica) **and gravel** (See Note 2), from Wyoanna, Falls and La Grange, Penn., to Apalachin, N. Y., $1.60 per ton of 2000 lb. Reason—Proposed rate compares favorably with rates on like commodities from Sayre, Penn., to Nicholson and La Plume, Penn., and from Wyoanna, Penn., to Northampton and Nesquehoning, Penn.

16720. **Sand and gravel** (other than blast, engine, glass, molding or foundry) (See Note 2), from Bragers, Md., to Union Bridge, Md., $1.15 per ton of 2000 lb. Reason—Proposed rate compares favorably with rates from Port Covington, Md., to Williamsport, Hagerstown, Md., Waynesboro, Gettysburg and York, Penn., as per W. Md. I. C. C. 7778.

16737. **Limestone, screenings,** carloads (See Note 2), from Ogdensburg, N. J., to Jamesville, N. Y., to Syracuse, N. Y., inclusive, and North Brookfield, N. Y., to Utica, N. Y., inclusive, $2.10 per ton of 2000 lb. Reason—Proposed rates are the present rates on limestone, agricultural, dust, ground, etc., as now published from and to points in question, as per N. Y. S. & W., I. C. C. 3146.

16744. **Crushed stone,** carloads (See Note 2), from Jamesville, Rock Cut, Solvay and Syracuse, N. Y., to L. V. R. R. stations, Van Etten, West Danby, Trumansburg, Sheldrake Springs, Rodburn, Alpine, Burdett, N. Y., and various, rates ranging from $1.35 to $1.60 per ton of 2000 lb. Reason—Proposed rates compare favorably with rates from Jamesville, N. Y., to Litchfield, Bath, Lowman, Norwich, N. Y., and Wyoming, Penn.

16745. **Gravel and sand,** N. O. I. B. N. in O. C., except blast, engine, foundry, glass molding, quartz, silex and silica, carloads (See Note 2), to D. L. & W. R. R. stations, Scranton, Dalton, Kinksley, Alford, Penn., Binghamton, Johnson City, Ithaca, Elmira, Williards, Norwich, Waterville, Clayville, Utica, N. Y., and various, from Whitneys Point, N. Y., rates ranging from 65c to $1.10 per ton of 2000 lb., and from Sherburne, N. Y., rates ranging from 75c to $1.30 per ton of 2000 lb. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory as per D. & H. Co. I. C. C. 13499 and N. Y. O. & W. Ry. 9414.

16746. **Crushed stone, trap rock, mine rock, broken stone and stone screenings,** carloads (See Note 2), to D. L. & W. R. R. stations, Scranton, Dalton, Kingsley, Alford, Penn., Binghamton, Johnson City, Ithaca, Elmira, Willards, Norwich, Waterville, Clayville, Utica, N. Y., and various, from Whitneys Point, N. Y., rates ranging from 65c to $1.25 per ton of 2000 lb.; and from Sherburne, N. Y., rates ranging from 65c to $1.35 per ton of 2000 lb. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory as per D. & H. Co. I. C. C. 13499 and N. Y. O. & W. Ry. 9414.

6750. **Crushed stone,** carloads (See Note 2), from Morrisville and Tullytown, Penn., to Avon, N. J., 90c per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force to Toms River, River Bank, Sea Girt and Manasquan, N. J., as per P. R. R. G. O. I. C. C. 13940 and 14500.

16751. **Agricultural, land,** chemical, gas or glass **lime,** carloads, minimum weight 30,000 lb., also **ground limestone,** carloads, minimum weight 50,000 lb., from Knickerbocker, Howellville, Rambo, Plymouth Meeting, Blue Bell and Devault, Penn., to Birdsboro, Penn.; 7c per 100 lb. Reason—To establish rates which will be comparable with those in force from Cedar Hollow district and Swedeland, Penn., as per Reading Co. I. C. C. J8461 and P. R. R. G. O. I. C. C. 14567.

16753. **Broken stone,** carloads (See Note 2), from Foxcroft, Penn., to Long Island R. R. Croup "C" points, $3.10 per ton of 2000 lb. Reason—Proposed rates are comparable with rates from Monocacy, Birdsboro, Clinton and Temple, Penn., to New York, N. Y., as per P. R. R. G. O. I. C. C. 14153.

16764. **Crushed stone,** carloads (See Note 2), from Lime Crest, N. J. Rates in cents per ton of 2000 lb.

To—	Prop. rate	To—	Prop. rate
Maybrook, N. Y.....	90	Andover, N. J.....	50
Greycourt, N. Y.....	80	Allamuchy, N. J.....	69
E. Chester, N. Y...	80	G. Meadows, N. J.	75
Warwick, N. Y.....	80	Buttzville, N. J.....	81
Vernon, N. J.....	75	Belvidere, N. J.....	81
Hamburg, N. J.....	50	Easton, Penn. 105	

Reason—Proposed rates are fairly comparable with rates on like commodities from and to points in the same general territory.

16781. **Unburnt ground limestone,** carloads, minimum weight 50,000 lb., from Barber, Va., to P. R. R. main line stations Delaware division, Wilmington, Del., to Delmar, Del., inclusive, $3.70 per ton of 2000 lb. Reason—Present rates are combination rates and it is desired to establish through commodity rates.

16783. (A) **Gravel and sand,** other than blast, engine, foundry, glass, molding or silica, carloads, and (B) **sand, blast, engine, foundry, glass, molding or silica,** carloads, from Daguscahonda, Penn., to Byrndale and Force, Penn., (A) $1.05, (B) $1.17, and to Shawmut and Drummond, Penn., (A) $1.15, (B) $1.26 per ton of 2000 lb. Reason—Proposed rates compare favorably with existing rates now in effect between points in the same general territory as per P. R. R. G. O. I. C. C. Nos. 14417, 14198, and P. S. & N. I. C. C. 3461.

16785. **Agricultural, land,** chemical, gas or glass **lime,** carloads, minimum weight 30,000 lb., also **ground limestone,** carloads, minimum weight 50,000 lb., from York, Penn., to Nelsons Siding to Nebraska, Penn., inclusive; 18½c per 100 lb. Reason—Proposed rates are comparable with those in force from Martinsburg, W. Va., to the same points as per P. R. R. G. O. I. C. C. No. 14567.

SOUTHWESTERN FREIGHT BUREAU DOCKET

13591. **Gypsum rock,** from Gypmine, Texas, to New Orleans, La. To establish a rate of 23c per 100 lb. on gypsum rock, carloads (See Note 2), but not less than 60,000 lb., from Gypmine, Texas, to New Orleans, La. It is stated that the proposed rate of 23c per 100 lb. is necessary in order to meet competition from Southard, Okla.

Recent I. C. C. Proposed Reports

T .& T. I. and S. 2910. Commodity rates on fluxing limestone in box cars from and to points in the trunk line association not in excess of the rates on ground limestone will not be unreasonable for application. Proposed cancellation of commodity rates not justified.

19421. Rate of 14 cents on 40 carloads of cement from Sellersburg, Ind., to Sixdam, Ky., not unreasonable.

19107. Rate on crushed stone (roofing granules) from Gladhill and Slate, Penn., to Erie, Penn., on interstate movement not unreasonable. Complaint recommended dismissed.

19203. Crushed Stone. Examiner Richard Yardley has recommended the dismissal of Western Asphalt Paving Corporation vs. Chicago, Milwaukee & St. Paul et al, on a finding that a rate of $1.45 per net ton, from Dell Rapids, S. D., to Remsen, Ia., applied on 40 carloads, shipped between July 28 and August 15, 1925, was not unreasonable. Reparation was sought to the basis of a rate of $1.36, established August 16, 1925.

18089. Ganister. Examiner W. R. Brennan, in Niles Fire Brick Co. vs. Pennsylvania, says the commission should find unreasonable rates on ganister stone, from points in Pennsylvania to Niles, O., and prescribe new ones for the future. The present rates were alleged to be unreasonable and unduly preferential of competitors at Hays and Latrobe, Penn., and other points in Pennsylvania, as well as unjustly discriminatory. The ganister stone origin group, the examiner said, extended from Maryville to Paddy Mountain, Penn., on the east and from Howard, Penn., on the north, to Altoona and Hollidaysburg, Penn., on the west, and to Cumberland, Md., on the south. The examiner said the rates had not been shown to have been in violation of section 3. He said they should be found unreasonable, in the past, present and for the future to the extent they exceeded or may exceed $1.90 per net ton from Flowing Spring, Horrell, Goodman, Moore's Mills, Port Matilda, Brookes Mills, and Barree, Penn., to Niles.

19362. Sand and Gravel. A finding of unreasonableness and an award of reparation have been recommended by Examiner T. K. Carpenter in Northwestern Lumbermen's Association vs. Soo Line, as to the rates charged on sand and gravel, from Barrett and Spur No. 311, Minn., to Wyndmere, Adams, Lankin and Nekoma, N. D., shipped between August 18, 1923, and July 2, 1925. The examiner said the rates should be found unreasonable to the extent they exceeded 4.5, 5.5, 6 and 6.5 cents to Wyndmere, Lankin, Adams and Nekoma, respectively.

Recent I. C. C. Decisions

17789. Sand and Gravel. A two-phase order requiring the establishment of new rates, not later than January 5; Missouri Gravel Co. vs. Chicago, Burlington & Quincy et al It is based upon a finding of the commission, by division 4, that the existing rates from La Grange, Mo., to points in central Illinois and to points on the Burlington in southeastern Iowa are unreasonable and unduly prejudicial. The first part of the order requires the establishment of rates from La Grange to destinations in Illinois, and to points intermediate thereto, not in excess of the following:

Rates in cents per ton, from LaGrange to Quincy, 60; Fowler, Seehorn, Hulls, 76; Bluffs, Clayton, Jacksonville, Pittsfield, Pike, Tennessee, Colchester, Macomb, Woodville, Carthage, Ferris, Carman, 88c; Bushnell, Abingdon, Larchland, Galesburg, Epperson, Murrayville, 101; Ashland, Eldred, Jerseyville, Petersburg, Springfield, Rushville, Beardstown, London Mills, Yates City, 113c; Atlanta, Bloomington, El Paso, Decatur, Hillsboro, Pana, Rosemond, San Jose, Taylorville, Tower Hill, 126.

The other part of the order requires the carriers to establish rates from La Grange to destinations in southeastern Iowa on the Burlington east of a line drawn from Pekin, Ia., through Ottumwa to Bloomfield, Ia., inclusive, of such points, and on and south of the line of the Burlington from Burlington, Ia., to Pekin, rates which shall not exceed the Iowa interstate distance scale, of which the following are given as representative, rates to other points in southeastern Iowa to be relatively adjusted, distance considered:

Rates in cents per ton, from LaGrange to Keokuk, 61; New Boston, 74; Donnelson, 79; Fort Madison, 84; Hamil, 88; West Point, 91; Salem, 94; Burlington, 97; Mount Pleasant, 100; Mediapolis, 106; Glendale, 109; Fairfield, 113; Libertyville, Bloomfield, Winleld, 115; Batavia, 117; Ottumwa, 124; Pekin, 135.

The specific finding as to rates in central Illinois is that they have been, are, and for the future will be unreasonable and unduly prejudicial to the extent they have exceeded, exceed or may exceed the basis prescribed in Dolese Bros. Co. vs. Santa Fe, 89 I. C. C. 110, and 122 I. C. C. 133.

Prior to June 10, 1925, when the present rates to points on the Burlington made reparation on shipments described. In this report the commission said the complainant was entitled to further reparation on those shipments in the amount that the charges collected and still retained exceed the charges that would accrue at the rates herein found reasonable.

Rating on Telescoped Barrels

IN a proposed report on further hearing in No. 16832, J. D. Hollingshead Co. vs. Ann Arbor et al., Examiner J. Edgar Smith has recommended a finding that telescoped barrels in Official Classification should be rated fifth class, minimum 24,000 lb., subject to rule 34, and that, for the future, shipments from Louisville, Ky., and Thebes, Ill., governed by the Official Classification, should be charged no higher than the contemporaneous fifth class rates, minimum 24,000 lb., subject to rule 34. The original report is in 115 I. C. C. 95, in which it was held that the barrels should be rated sixth class, minimum 30,000 lb., subject to rule 34.

South Africa Imports More American Crushers

THE import of stone crushers into South Africa from the United States has been gradually increasing during the past three years, and where formerly British manufacturers dominated this trade, American machines are now seen in increasing numbers. American participation has increased from a value of £1,650, or only 2.7%, in 1923, when separate statistics were first made available, to £10,290, or 21.5%, during 1926. The British share of this business, although still dominant, has declined from £59,209, or 97%, to £36,315, or 76%.

Imports in 1924 were valued at £60,882, Great Britain supplying £59,209 and the United States £1,650. In 1925, of a total of £32,824, Great Britain supplied £29,757 and the United States £3,041. To the 1926 total of £47,789, Great Britain contributed £36,375 and the United States £10,290—*U. S. Commerce Reports.*

"Dragon" Cement Constitutes First Shipment Over New Bridge at Bath, Me.

ONE of Maine's newest industries, the Lawrence Portland Cement Co. plant at Thomaston, being erected at a cost of $4,000,000, was joined Monday with the state's latest contribution to commerce, the new $3,000,000 Kennebec bridge at Bath. This was brought about by the fact that the first freight train to pass over the new bridge spanning the Kennebec river here, was made up of 14 cars laden with "Dragon" cement, being rushed to Thomaston to complete construction on the new plant.

Representatives of the Lawrence Portland Cement Co. from Boston, New York, Siegfried, Penn., and Thomaston, were at Bath to participate in the ceremony which marked the passage of the first trains. Neatly bannered, the freight moved out of Bath about 11 o'clock. The train reached Portland after a record two-day run from the Lehigh Valley over the New York, New Haven and Hartford railroad, and was moved to Brunswick, where it was assembled early in the day and moved over the Maine Central to Bath. One banner on the train marked it as the first freight to cross the Kennebec bridge, while another labeled it as a "Solid Train of 'Dragon' Portland Cement, to Finish Building New England's Own and Only Cement Mill, Thomaston, Maine."

The entire shipment, officials here said, would be consumed in completing Knox county's newest industry, which has already used up approximately 200,000 bags of cement, the building being of concrete and reinforced steel. More than 300,000 bags will be necessary to finish the job.

The day's event was without mishap. The train was halted at the Bath station for a brief time to permit "shots" by newspaper photographers and movie men from New York and Boston. It was stopped again just before it completed passage over the bridge into Woolwich, and at the Woolwich station other photographs of the train were made. The train was then run to Rockland, where it was switched onto the direct branch running into the yards of the Thomaston plant. —*Portland* (Me.) *Evening News.*

Contracts Let for New California Cement Plant

CONTRACTS were let recently for the machinery for the $750,000 cement plant to be erected near Devore in San Bernardino county by the American Portland Cement Co., according to Briant S. Young, president of the concern.

Mr. Young states that 95% of the machinery with which the plant will be equipped is to be purchased in Los Angeles, in line with the policy of the company to buy locally-made products as far as possible.

The company does not plan to sell the cement manufactured at the Devore plants, expecting to make use of the entire output as the raw materials for the manufacture of building blocks, according to Mr. Young. —*Los Angeles* (Calif.) *News.*

Ellis Soper Elected Vice-President of Penn-Dixie Cement Corporation

ELLIS C. SOPER, who has a record of many years as a designing, construction and consulting engineer, of cement plants,

Ellis C. Soper

has given up his engineering practice to become vice-president of the Pennsylvania-Dixie Cement Corporation, with headquarters at 131 East 46th St., New York City.

Largest Lake Cargo of Limestone

SETTING a new high mark in fresh water shipping annals, the "Carl D. Bradley," biggest Great Lakes steamer afloat, eased into the new Buffington (Ind.) harbor last month with 15,724 tons of limestone, said to be the largest load ever carried on fresh water. Her own automatic unloading machinery discharged the cargo in five hours, which is believed to break all records for speed. The limestone came from the Calcite, Mich., quarries, which are said to be the largest in the world.

This huge new vessel is the latest example of the modern self-unloading type of freighter. Buffington harbor at the Chicago plant of the Universal Portland Cement Co. is one of the few harbors on the Great Lakes deep enough to accommodate so large a boat. A million-ton storage yard provides ample space for raw materials brought in by water and permits the cement company to store materials against close of navigation thus promoting uninterrupted production.

Rumor of North Carolina Limestone Project

OWNERS of extensive limestone deposits near Kinston, N. C., say a large plant may be erected here to turn out agricultural limestone for farmers in the Carolinas and Georgia. The company to erect the plant would be capitalized at $500,000, they have heard.

Deposits on many farms in at least three counties have been examined and investigators have found a nearly inexhaustible supply of the material, being used by agriculturists throughout this region in increasing quantity. Northern interests are back of the venture.

Chamber of commerce officials say the factory will be located at one of two points in the territory, and that Kinston is one of them. Heaviest deposits have been found near this city. It will be unnecessary to expend more than $500,000 for buildings and machinery because of the accessibility and condition of the product.—*Raleigh* (N. C.) *News and Observer.*

U. S. Gypsum Company Promotes John R. Davis

JOHN R. DAVIS, who has been works manager of the U. S. Gypsum Co.'s plant at Oakfield, N. Y., has been named assistant to the vice-president of the company in charge of production at the Chicago office. He is to be succeeded by Cecil B. Pooler.

Mr. Pooler has been works manager of the company's plant at Fort Dodge, Iowa. He entered the service of the U. S. Gypsum Co. over 20 years ago as trackman's helper in the mines. He rose rapidly to the managership of the Fort Dodge plant.

Mr. Pooler was influential in organizing an employe's band and orchestra at Fort Dodge. Welfare activities for workers and their families are his hobby. Mr. Pooler's plant at Fort Dodge won many prizes in competitive plant operation. Mr. Pooler is married. He has four sons.—*Rochester* (N. Y.) *Democrat and Chronicle.*

To Enlarge Sturgeon Bay Stone Plant

SAMUEL EELLS, vice-president, Dolomite, Inc., Maple Grove, Ohio, which recently purchased the Leatham D. Smith Stone Co., Sturgeon Bay, Wis., announces that this property will be operated as the Sturgeon Bay Co. A large amount of money will be expended during the next six months to rebuild and enlarge the facilities at Sturgeon Bay to provide for a production in the first year of the new management, 1928, of not less than 1,000,000 tons of crushed stone. The product will be carefully graded, screened and washed by the most approved and up-to-date methods. Mr. Eells' home office is 1510 Hanna Bldg., Cleveland, Ohio.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75		1.60	1.30	1.30	1.30
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Danbury, Conn.	2.25	2.25	2.00	1.75	1.50	
Dundas, Ont.	.30	1.05	1.05	.90	.90	.90
Frederick, Md.	.50@1.00	1.35@1.50	1.15@1.50	1.10@1.15	1.05@1.10	1.05@1.10
Munns, N. Y.	1.00	1.50	1.25	1.30	1.25	
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	
Prospect, N. Y.	1.00	1.40	1.25	1.25	1.25	
Rochester, N. Y.	1.50	1.50	1.50	1.50	1.50	1.50
Walford, Penn.			1.35h	1.35h	1.35h	1.35h
Watertown, N. Y.	1.00		1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Afton, Mich.			.50	.75		1.50
Alton, Ill.	1.85		1.85			
Buffalo and Linwood, Iowa	1.10		1.45	1.25	1.30	1.30
Chasco, Ill.	1.00@1.30		1.00@1.15		1.00@1.15	
Columbia, Krause, Valmeyer, Ill.	1.10@1.50	1.10@1.25	1.20@1.35	1.10@1.35	1.10@1.35	‖1.25
Flux (Valmeyer)	1.10@1.50			1.75		1.75
Dubuque, Iowa	1.00	1.25		1.25	1.25	
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
River Rouge, Mich.	1.20	1.20	1.20	1.20	1.20	1.20
Milltown, Ind.		.90@1.00	1.00@1.10	.90@1.00	.85@ .90	.85@ .90
Mt. Vernon, Ill.	1.10@1.20	1.00	1.00	1.00	1.00	
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	
Stone City, Iowa			1.20	1.10	1.00	
St. Vincent de Paul, Que.	.70	1.35	1.00	.85	.80	1.25
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Ont.	1.55	2.05	2.05	1.90	1.90	1.90
Waukesha, Wis.	.90			.90	.90	.90
Wisconsin Points	.50		1.00	.90	.90	
Youngstown, Ohio	.70j	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h
SOUTHERN:						
Alderson, W. Va.	.50	1.40	1.35	1.25	1.20	1.15
Atlas, Ky.	.50	1.00	1.00	1.00	1.00	1.00
Brooksville, Fla.	.75		2.65	2.65	2.40	2.00
Cartersville, Ga.	1.50	1.65	1.65	1.35	1.15	1.15
Chico and Bridgeport, Tex.	1.00	1.30	1.25	1.20	1.05	1.00
El Paso, Tex.	1.00	1.00	1.00	1.00		
Graystone, Ala.			Crusher run, screened, $1 per ton			
Kendrick and Santos, Fla.			3½ in. and less, $1 per ton			
Ladds, Ga.		1.65	1.65	1.35	1.15	1.15
New Braunfels, Tex.	.60	1.25	1.10	.90	.90	.90
Rocky Point, Va.	.50@ .75	1.40@1.60	1.30@1.40	1.15@1.25	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kan.	.50	1.90	1.90	1.90	1.90	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25	1.25	1.25	1.25	1.00	
Rock Hill, St. Louis Co., Mo.			1.10@1.35 all sizes			
Sugar Creek, Mo.	1.15*	1.60†	1.60‡	1.60§	1.00¶	

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.80	1.70	1.45	1.20	1.05	
Duluth, Minn.	.90	2.00	1.75	1.55	1.25	1.25
Dwight, Calif.	1.00	1.00	1.00	.90	.90	
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Tex.	2.50	2.25	1.65	1.35	1.25	
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	
Northern New Jersey	1.40	1.40	1.80	1.40	1.40	1.40
Oakland and El Cerito, Calif.	1.00	1.00	1.00	.90	.90	
Richmond, Calif.	.75		1.00	1.00	1.00	
San Diego, Calif.	.50@ .75	1.25@1.50	1.25@1.50	1.10@1.25	1.10@1.25	
Springfield, N. J.	1.70@1.80	2.10@2.20	2.00@2.10	1.60@1.70	1.60@1.70	1.50@1.60
Toronto, Ont.		3.58@4.05	3.05@3.80			
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	
Columbia, S. C.		2.00	1.90	1.90	1.75	
Eastern New York—Syenite	.75	1.25	1.25	1.25	1.25	1.25
Eastern Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.			Crushed flint rock, 2.50 per cu. yd.			
Graystone, Ala.—Granite	.50					
Lithonia, Ga.	.75a	1.75b	1.60	1.45	1.35	
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	
Middlebrook, Mo.	3.00@3.50		2.00@2.25	2.00@2.25		1.25@3.00
Richmond, Calif.—Quartzite	.75		1.00	1.00	1.00	
Rochester, N. Y.			Dolomite, all sizes, $1.40 per ton			
Somerset, Penn. (sand-rock)			1.50 to 1.85			
Toccoa, Ga.—Granite		1.30				

*¼ to ½ in. †¼ to 1 in. ‡¾ to 1¼ in. §¼ to 2¼ in. ¶Dust. ‖Rip rap per ton. (a) Sand. (b) to ⅜ in. (c) 1 in., 1.40. (d) 2in., 1.30. (h) Less 10c discount. (j) Less 10% net ton. (l) Less .05. (e) Agstone to June 15, 1927. a¾ to ¼ in. b1 to ¼ in. c1½ to ¼ in. (A) Plus 4% sales tax, less 2% discount 30 days.

Agricultural Limestone

(Pulverized)

Alderson, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Alton, Ill.—Analysis, 98% $CaCO_3$, 0.01% $MgCO_3$; 90% thru 100 mesh	6.00
$MgCO_3$; 90% thru 100 mesh	4.50
Atlas, Ky.—90% thru 100 mesh	2.00
50% thru 100 mesh	1.00
Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh	1.50
Blackwater, Mo.—100% thru 4 mesh	1.00
Branchton, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh	5.00
Cape Girardeau, Mo.—Analysis, $CaCO_3$, 93½%; $MgCO_3$, 3½%; 50% thru 50 mesh	1.50
Cartersville, Ga.—Pulverized limestone, 2.00; 50% thru 100 mesh	1.50
Charleston, W. Va.—Marl, per ton, bulk	3.00
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Tex.—50% thru 50 mesh, 1.75; 50% thru 100 mesh	2.25
Cypress, Ill.—90% thru 100 mesh	1.35
Ft. Springs, W. Va.—50% thru 50 mesh	1.50
Hartford, Conn.—Paper bags, 4.25; cloth bags, 4.75; bulk	3.25
Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh; bags	3.95
Bulk	2.70
Jamesville, N. Y.—Analysis 89% $CaCO_3$, 4% $MgCO_3$; pulverized; bags, 4.25; bulk	2.75
Joliet, Ill.—Analysis, 52% $CaCO_3$; 44% $MgCO_3$; 90% thru 100 mesh	3.50
Knoxville, Tenn.—80% thru 100 mesh; bags, 3.95; bulk	2.70
Ladds, Ga.—Analysis, $CaCO_3$, 64%; $MgCO_3$, 32%; pulverized; 50% thru 50 mesh	1.50@ 2.75
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marlbrook, Va.—Analysis, 80% $CaCO_3$; 10% $MgCO_3$; bulk, 1.75; bags	3.75
Marl—Analysis, 90% $CaCO_3$; 10% $MgCO_3$; bulk, 2:25; bags	4.00
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Middlebury, Vt.—Analysis, 90.05% $CaCO_3$; 90% thru 50 mesh	6.00
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis, $CaCO_3$, 97%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk	2.00
Syracuse, N. Y.—Analysis 89% $CaCO_3$; $MgCO_3$, 4%; bags, 4.25; bulk	2.75
Toledo, Ohio—30% thru 50 mesh	2.25
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50
West Stockbridge, Mass.—Analysis, 90% $CaCO_3$, 50% thru 100 mesh; cloth bags, 4.75; paper, 4.25; bulk	3.25
Carload, 7.50; less than carload	9.00

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis, 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—90% thru 4 mesh	1.00
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5%; $MgCO_3$; 90% thru 10 mesh	1.50

(Continued on next page)

Agricultural Limestone

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 90% thru 100 mesh	3.50
Chicago, Ill. — 50% thru 100 mesh; 90% thru 4 mesh	.80
Columbia, Krause, Valmeyer, Ill. — Analysis, 90% $CaCO_3$; 100% thru 4 mesh	1.10@ 1.50
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh	1.35
Danbury, Conn.—Analysis, 79% $CaCO_3$, 11% $MgCO_3$; 60% thru 100 mesh; 80% thru 50 mesh; 100% thru 4 mesh; bags, 4.25; bulk	3.25
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Kansas City, Mo. — 50% thru 100 mesh	1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92¼ $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@ 2.35
McCook, Ill.—90% thru 4 mesh	.90
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 100% thru 4 mesh; 20% thru 100 mesh	1.50
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Mountville, Va. — Analysis, 62.54% $CaCO_3$; $MgCO_3$, 35.94%, 100% thru 20 mesh; 50% thru 100 mesh, bags	5.00
Pixley, Mo. — Analysis, 96% $CaCO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich. — Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes	1.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.15

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Joliet, Ill.—Analysis, 55% $CaCO_3$; 45% $MgCO_3$; 95% thru 100 mesh; paper bags	4.50
Marblehead, Ohio—Analysis, 80% $CaCO_3$; 99.8% thru 100 mesh; bulk	3.25
Piqua, Ohio, sacks, 4.50@5.00; bulk	3.00@ 3.50
Rocky Point, Va.—85% thru 200 mesh, bulk	2.25@ 3.50
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Buffalo, N. Y.	2.00@ 2.50
Cedarville and S. Vineland, N. J.	1.75
Estill Springs and Sewanee, Tenn.	1.50
Franklin, Penn.	2.00
Gray Summit and Klondike, Mo.	1.75@ 2.00
Klondike, Mo.	2.00
Los Angeles, Calif.—Washed	5.00
Mendota, Va.	2.25@ 2.50
Michigan City, Ind.	.35
Mineral Ridge and Ohlton, Ohio	2.50
Oceanside, Calif.	3.00
Ohlton, Ohio	2.50
Ottawa, Ill.	1.25
Pittsburgh, Penn.	3.00@ 4.00
Red Wing, Minn.	1.50
Ridgway, Penn.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.00
San Francisco, Calif.	4.00@ 5.00
Silica, Va.	2.50
St. Louis, Mo.	2.00
Sewanee, Tenn.	1.50
Thayers, Penn.	2.50
Zanesville, Ohio	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.75
Chippewa Falls, Wis.		.25*
Columbus, Ohio		.15@ .30
Dresden, Ohio		1.25
Eau Claire, Wis.	3.00@ 4.30	1.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.40	1.40	2.25		2.25	2.25
Buffalo, N. Y.	1.10	1.05	1.05	1.05		1.05
Erie, Penn.		1.00*		1.50*	1.75*	
Farmingdale, N. J.	.80	.70	1.15	1.40		
Leeds Junction, Me.		.50	1.75		1.25	1.00c
Machias Jct., N. Y.	.75	.75	.85	.75	.75	.75
Montoursville, Penn.	1.00	.75@ .85	.75	.75	.75	.75
Northern New Jersey	.50	.50	1.25	1.25	1.25	
Portland, Me.		1.00	2.25		2.00	
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Penn.		2.00				
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.		.60	1.70	1.50	1.30	1.30
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Appleton and Mankato, Minn.		.45	1.25	1.25	1.25	1.25
Attica, Ind.			All sizes .75@.85			
Aurora, Moronts, Oregon, Sheridan, Yorkville, Ill.	.25@ .80	.50@ .70	.10@ .40	.50@ .70	.60@ .80	.60@ .80
Barton, Wis.		.50	.50	.60	.60	.60
Chicago district, Ill.	.70	.55	.55	.60	.60	.60
Columbus, Ohio		.75	.75	.75	.75	
Des Moines, Iowa		.30	1.30	1.30	1.30	1.30
Eau Claire, Chippewa Fls., Wis.	.40	.40	.50@ .85	.85@ .90	.85@ .90	
Elkhart Lake, Wis.	.50	.30	.30	.60	.50	.40
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Grand Haven, Mich.		.60@ .80	.70@ .90	.70@ .90		.70@ .90
Grand Rapids, Mich.	.50	.50	.90	.80	.70	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.	.50	.50		.60		.70
Humboldt, Iowa	.50	.50	1.50	1.50	1.50	1.50
Indianapolis, Ind.	.60	.60	.75	.75	.75	.75
Joliet, Plainfield & Hammond, Ill.	.60	.50	.50	.60	.60	.60
Mason City, Iowa	.50@ .60	.50@ .60	1.30	1.30	1.20	1.20
Mankato, Minn.				1.25	1.25	1.25
Mattoon, Ill.			.75@.85 all sizes			
Milwaukee, Wis.	.96	.91	1.06	1.06	1.06	1.06
Minneapolis, Minn.	.65*	.65*	1.75*	1.75*	1.75*	1.75*
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.40@ .50	.40@ .50	1.40	1.35	1.25	
Pittsburgh, Penn.	1.25	1.25	.85	.85	.85	.85
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	1.20e	1.45f	1.55a	1.45	1.45	1.45
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.85	.80	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.50	.40	.50	1.00	1.00	1.15
Zanesville, Ohio		.60	.50	.60	.80	
SOUTHERN:						
Charleston, W. Va.			River sand and gravel, all sizes, 1.40			
Brewster, Fla.		.45	2.25			
Brookhaven, Miss.	1.25	.70	1.25	1.00	.70	.70
Chattahoochie River, Fla.		.70		1.75		
Eustis, Fla.		.50@ .60				
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.		.50	.50			
New Martinsville, W. Va.	1.00	.90@1.00		1.10@1.20		.80@ .90
Roseland, La.	.25	.25	1.25	1.00	.65	.65
WESTERN:						
Kansas City, Mo.		.70@ .75				
Crushton, Durbin, Kincaid, Largo, Rivas, Calif.	.10@ .40	.10@ .40	.50@1.00	.50@1.00	.50@1.00	.50@1.00
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Phoenix, Ariz.	1.25	1.00*	2.00*	2.00*	1.10*	1.00*
Pueblo, Colo.	.70	.60		1.20		1.15
San Diego, Calif.		.40@ .50	.80@1.00	.80@1.00	.65@ .80	.65@ .80
Steilacoom, Wash.*	.50	.25@ .50	.25@ .50	.25@ .50	.25@ .50	.25@ .50

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Brookhaven, Miss.						.60
Buffalo, N. Y.	1.10	.95		.85		.85
Burnside, Conn.	.75					
Des Moines, Iowa	.50					
Dresden, Ohio	.50	.60	.70	.65	.65	.60
East Hartford, Conn.	.85*d					
Eau Claire, Chippewa Fls., Wis					.65	
Gainesville, Texas					.55	
Grand Rapids, Mich.				.50		
Hamilton, Ohio					1.00	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Lindsay, Texas		1.10			.55	
Macon, Ga.	.35					
Mankato, Minn.	.30					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Roseland, La.					.50	
Somerset, Penn.		1.85@2.00		1.50@1.75		
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.	.60	.60	60	.60	.60	.60
York, Penn.	1.10					

*Cubic yd. ‡Delivered on job by truck. (a) ⅝-in. down. (b) River run. (c) 2½-in. and less. ¶By truck only. (d) Delivered in Hartford, Conn., $1.50 per yd. (e) Mississippi River. (f) Meramee River.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.10	2.00	2.25	1.50		4.00g	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75	1.75		1.75	1.75@2.00		
Buffalo, N. Y.	1.50	1.50		2.00@2.50			
Cedarville and S. Vineland, N. J.				2.25			
Columbus, Ohio	1.50@2.00	1.25@1.50	2.00	.30	1.75@2.00	2.75@4.50	
Dresden, Ohio	1.50@1.75	1.35@1.50	1.50@1.75	1.25	1.35		
Eau Claire & Chippewa Falls, Wis.						3.00	
Elco & Tamms, Ill.	Ground silica per ton in carloads—18.00@31.00						
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	1.75	1.75		1.75	1.75		
Kasota, Minn.							1.00
Klondike, Mo.				2.00	2.00		2.00
Massillon, O. (a)	2.00@2.25				2.00@3.00		
Mendota, Va.	Ground flint or silex—16.00@20.00 per ton						
Michigan City, Ind.				.30@ .35			
Millville, N. J.				1.75b		3.50	
Montoursville, Penn.				1.35@1.60	1.25@1.35		
New Lexington, O.	2.00	1.25					
Ohlton, Ohio	1.75	1.75		2.00b	1.75b	1.75b	
Ottawa, Ill.						3.50	
Red Wing, Minn.(d)					1.50	3.00	1.50
Ridgway, Penn.	1.50	1.50	1.75@2.00c				
Round Top, Md.				1.60		2.25	
San Francisco, Calif.[1]	3.50†	5.00†	3.50†	3.50@5.00†	3.50@5.00†	3.50@5.00†	
Silica, Va.	Potters' flint per ton, 9.00@10.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.	.60	.65		.70	.75		
Utica, Penn.	1.75	1.75		2.00			
Warwick, Ohio	1.75*@2.00	1.75*@2.00		*1.50	1.75*@2.00	1.75*@2.00	
Zanesville, Ohio	2.00	1.50	2.00	2.00	2.00		

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (b) Damp. (c) Shipped from Albany. (g) Dry. (a) Green, 1.50@1.75. (d) Filter sand, 3.00.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Erie and Dubois, Pa.	2.25	1.25	1.35	1.25	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.50	1.25		1.50			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*		1.45*	
Jackson, Ohio	1.75*	1.05*	1.55*	1.30*	1.05*	1.30*	
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n. O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.45*		1.45*	1.45*	1.45*	
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.	2.05*	.80*	1.35*	1.25*	.90*	.90*	

*5c per ton discount on terms.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.00
Buffalo, N. Y.		12.00	12.00	12.00			10.00	1.95[4]
Chazy, N. Y.		8.50	7.50	10.00		15.50[1]	8.50	14.00
Lime Ridge, Penn.					5.00[2]			
Pittsburgh, Penn.	12.50	8.50	8.50		9.00	11.00		
West Stockbridge, Mass.	12.00	10.00	5.60					2.00[12]
Williamsport, Penn.			10.00				6.00	
York, Penn.		9.50	9.50	10.50	8.50	10.50	8.50	1.65[7]
CENTRAL:								
Afton, Mich.							8.40	1.35
Carey, Ohio	12.50	8.50	8.15		9.00		8.00	1.50
Cold Springs, Ohio		8.50	8.50				8.00	
Cold Springs and Gibsonburg, Ohio	12.50	8.50	8.50		9.00	11.00		
Huntington, Ind.	12.50	8.50	8.50		9.00		8.00	
Luckey, Ohio	12.50							
Milltown, Ind.		8.50@10.00		10.00[8]			8.50[22]	1.35[10]
Scioto & Marble Cliff, O.		8.50	8.50	9.50	8.25	.62½	7.50	1.50[3]
Sheboygan, Wis.	11.50						9.50	
Wisconsin points[6]		11.50					9.50	
Woodville, Ohio	12.50	8.50	8.50		9.00	11.00[9]	9.00	1.50[3]
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Texas							7.00	1.50
Frederick, Md.		9.00	9.00	9.50	7.50	9.00	7.50	9.00
Graystone & Landmark, Ala.	12.50	10.00	10.00	10.00			8.50	1.50
Keystone, Ala.		10.00	8.00	10.00	8.00		8.00	1.50
Knoxville, Tenn.	20.25	10.00	10.00	10.00			8.50	1.50
New Braunfels, Tex.	18.00	12.00	10.00	12.00	10.00		9.50	
Ocala, Fla.		11.00	9.00				10.00	1.40
Saginaw, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
WESTERN:								
Cirtland, N. M.							15.00	
Limestone, Wash.	15.00	15.00	10.00	15.00	16.50	16.50	16.50	2.09
Los Angeles, Calif.	19.00	19.00	14.00		16.20		12.50	2.50
Dittlinger, Tex.		12.00@13.00					9.50[8]	1.50[23]
San Francisco, Calif.	20.00	20.00	13.50	21.00			14.50[20]	2.15
Tehachapi, Calif.[13]	17.00	15.00	12.00@15.00[11]	17.00	16.00		16.00	2.00
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

[1] Barrels. [2] Net ton. [3] Wooden, steel 1.70. [4] Steel. [5] 180 lb. [6] Dealers' prices, net 30 days less 25c discount per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] 180-lb. net barrel, 1.65; 280-lb. net barrel, 2.65. [8] To 11.00 [9] 80-lb. [10] To 1.50. [11] Refuse or air slack, 10.00@12.00 [12] To 3.00. [13] Delivered in Southern California. [22] To 9.00. [23] To 1.60. [20] To 16.50.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing Sand	Traction
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50
Franklin, Penn.		1.75
Michigan City, Ind.		.30
Montoursville, Penn.		1.10
Ohlton, Ohio	*1.75	*1.75
Red Wing, Minn.		1.00
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50	3.50
Thayers, Penn.		2.25
Warwick, Ohio		2.00
Zanesville, Ohio		2.50

*Damp.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel crayons, gross	1.00@ 2.80
Chatsworth, Ga.:	
Crude talc, grinding	5.00
Ground talc (150-200 mesh)	10.00
Pencils and steel worker's crayons, per gross	1.00@ 2.00
Chester, Vt.:	
Ground talc (150-200 mesh), paper bags	9.50@10.50
Same, burlap bags, bags extra	8.50@ 9.50
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc (for grinding)	5 00
Ground talc (150-200 mesh), bags	12.00
Pencils and steel worker's crayons, per gross	1.00@ 2.50
Emeryville, N. Y.:	
(Double air floated) including bags;	
325 mesh	14.75
200 mesh	13.75
Glendon, N. C.:	
Ground talc (150-200 mesh), bulk	6.00@10.00
Ground talc (150-200 mesh), bags	8.00@14.00
Pencils and steel crayons, gross	1.05@ 2.00
Blanks, .08 per lb.; cubes	50.00
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) 200-lb. bags, 300-350-mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.00
Ground talc (150-200 mesh), bags	7.50@16.00
Joliet, Ill.:	
Crude talc	5.00
Southern talc	17.00
Illinois talc	10.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (125-200 mesh), bags	10.00@15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock	
Columbia, Tenn.—B.P.L. 65-70%	3.50@ 4.50
Gordonsburg, Tenn.—B.P.L. 65-70%	3.75@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 72%	5.00@ 5.50
Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	8.00@ 9.00
Ground Rock (2000 lb.)	
Centerville, Tenn.—B.P.L. 65%	8.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 72%	5.00@ 5.50
Twomey, Tenn.—B.P.L. 65%	8.00@ 9.00

Florida Phosphate

(Raw Land Pebble)

(Per Ton)

Florida — F.o.b mines, gross ton, 68/66% B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton	125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—Per ton,	
Mine run	300.00
Clean shop scrap	25.00
Mine scrap	22.50@24.00
Roofing mica	37.50
Punch mica, per lb.	.12

Cut mica—50% from Standard List.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars	.....	10.50
Brandon, Vt. — English pink, English cream and coral pink	*12.50	*12.50
Brandon grey	*12.50	*12.50
Brighton, Tenn.— All colors and sizes	§3.00	§3.00
Buckingham, Que.—Buff stucco dash	.....	12.00@14.00
Chicago, Ill. — Stucco chips, in sacks, f.o.b. quarries	.....	17.50
Crown Point, N. Y.— Mica spar	.....	9.00@10.00
Dayton, Ohio	.....	6.00@24.00
Easton, Penn.— Green stucco	.....	12.00@18.00
Green granite	.....	14.00@20.00
Haddam, Conn.—Felstone buff	15.00	15.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio—Concrete facings and stucco dash	.....	10.00@20.00
Middlebrook, Mo.—Red	.....	20.00@25.00
Middlebury, Vt.—Middlebury white	‡9.00	‡9.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags	.....	5.50@ 7.50
Milwaukee, Wis.	.....	14.00@34.00
New York, N. Y.—Red and yellow Verona	.....	32.00
Phillipsburg, N. J.— Royal green granite	.....	12.00@14.00
Randville, Mich.— Crystalite crushed white marble, bulk	5.00@ 7.50	4.50@ 7.50
Rose pink granite, bulk	.....	12.00
Stockton, Calif.—"Natrock" roofing grits	.....	12.00@20.00
Tuckahoe, N. Y.—Tuckahoe white	12.00	.....
Wauwatosa, Wis.	.....	20.00@32.00
Wellsville, Colo. — Colorado Travertine Stone	15.00	15.00

*Carloads, including bags; L.C.L. 14.50.
†C.L. L.C.L. 17.00.
‡Carloads, including bags; L.C.L. 10.00.
§Bulk, car lots, minimum 30 tons.

Potash Feldspar

Auburn and Topsham, Me. — Color white, 98% thru 160-mesh 19.00

Bristol, Tenn.—Color, white; analysis, K_2O, 6 to 10%; Na_2O, 2½ to 4%; SiO_2, 68 to 78%; Fe_2O_3, 12 to 20%; Al_2O_3, 16.5 to 18.5%; 99% thru 200 mesh; bulk, depending on grade ..... 14.50@18.00

Brunswick, Me.—Color, white; 99% thru 140 mesh, bulk 19.00

Buckingham, Ore.—White, analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk 9.00

De Kalb Jct., N. Y.—Color, white, bulk (crude) 9.00

East Hartford, Conn.—Color, white, 95% thru 60 mesh, bags 16.00
96% thru 150 mesh, bags 28.00

East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk 19.35
Soda feldspar, crude, bulk, per ton .. 22.00

Glen Tay Station, Ont.—Color, red or pink; analysis, K_2O, 12.81%; crude 7.00

Keystone, S. D.—White; bulk (crude) 8.00

Los Angeles, Calif.—Color, white; analysis, K_2O, 12.16%; Na_2O, 1.53%; SiO_2, 65.60%; Fe_2O_3, .10%; Al_2O_3, 10.20%; crude 10.00
Pulverized, 95% thru 200 mesh; bags, 22.00; bulk 22.00

Murphysboro, Ill.—Color, prime white; analysis, K_2O, 12.60%; Na_2O, 2.35%; SiO_2, 63%; Fe_2O_3, .06%; Al_2O_3, 18.20%; 98% thru 200 mesh; bags, 21.00; bulk 20.00

Penland, N. C.—White; crude, bulk .. 8.00
Ground, bulk 16.50

Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; Si_2O, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; bulk .. 18.00
Crude 9.00

Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk 18.00
99% thru 140 mesh, bulk 16.00

Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude .. 7.50@ 8.00

Chicken Grits

Afton, Mich.(Limestone), per ton 1.75

Belfast and Rockland, Me.—(Limestone), bags, per ton 10.00

Cartersville, Ga.—(Limestone), per bag 2.00

Centerville, Iowa—(Gypsum), per ton .. 18.00

Chico and Bridgeport, Tex.—Hen ..... ¶9.00
Baby chick, per ton ..... ¶8.00

Danbury, Conn.—(Limestone), bulk .... 6.00@ 7.00

Easton, Penn.—Per ton, bulk 3.00

Joliet, Ill.—(Limestone), bags, per ton 4.50

Knoxville, Tenn.—Per bag 1.25

Los Angeles, Calif.—(Feldspar), per ton 15.00

Gypsum, Ohio—(Gypsum), per ton 10.00

Hartford, Conn. ..... ‡7.50@*9.00

Limestone, Wash. — (Limestone), per ton 12.50

Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag ..... .50

Middlebury, Vt.—Per ton 10.00

Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk 5.00

Seattle, Wash.—(Limestone), bulk, per ton 10.00

Warren, N. H.—(Mica), per ton ..... 3.85@ 3.90

Waukesha, Wis.—(Limestone), per ton 20.00

West Stockbridge, Mass.—(Limestone), bulk ..... ‡7.50@*9.00

Wisconsin Points—(Limestone), per ton 9.00

*L.C.L. †Less than 5-ton lots. ‡C.L. ¶100-lb. bags.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga. 9.00

Anaheim, Calif. ..... 10.50@11.00

Barton, Wis. 10.50

Boston, Mass. 17.00*

Brighton, N. Y. 19.75*

Brownstone, Penn. 11.00

Dayton, Ohio ..... 12.50@13.50

Detroit, Mich. 16.00*

Farmington, Conn. 13.00

Flint, Mich. ..... ¶12.00@17.50*

Grand Rapids, Mich. 12.50

Hartford, Conn. ..... 14.00@19.00*

Jackson, Mich. 12.25

Lakeland, Fla. ..... 10.00@11.00

Lake Helen, Fla. ..... 9.00@12.00

Lancaster, N. Y. 12.50

Madison, Wis. 12.50a

Michigan City, Ind. 11.00

Milwaukee, Wis. ..... 10.50@13.00*

Minneapolis and St. Paul, Minn. 10.00

Minnesota Transfer 10.00

New Brighton, Minn. 10.00

Pontiac, Mich. ..... 16.00@17.00

Portage, Wis. 16.00

Prairie du Chien, Wis. ..... 18.00@22.50

Rochester, N. Y. 19.75*

Saginaw, Mich. 13.50

San Antonio, Texas 16.00

Sebewaing, Mich. 12.00

Sioux Falls, S. Dak. 13.00

South River, N. J. 13.00

Syracuse, N. Y. ..... 18.00@20.00

Toronto, Canada ..... 16.00*†

Wilkinson, Fla. ..... 12.00@16.00

Winnipeg, Canada 14.00

*Delivered on job. †5% disc., 10 days. ¶Dealers' price. (a) Less 50c discount per M., 10 days.

Portland Cement

Prices per bag and per bbl., without bags, net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.	.84¼	3.37
Atlanta, Ga.	.....	2.35
Baltimore, Md.	.....	2.15@2.25
Birmingham, Ala.	.....	2.30
Boston, Mass.	.....	2.13@2.23
Buffalo, N. Y.	.....	2.20@2.30
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa	.....	2.24
Charleston, S. C.	.....	2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio	.58	2.32
Cleveland, Ohio	.....	2.24
Chicago, Ill.	.51¼	2.05
Columbus, Ohio	.57¼	2.29
Concrete, Wash.	.....	2.35
Dallas, Texas	.....	2.00
Davenport, Calif.	.....	2.45*
Davenport, Iowa	.....	2.24
Dayton, Ohio	.58¼	2.33
Denver, Colo.	.66¼	2.65
Des Moines, Iowa	.....	2.05
Detroit, Mich.	.....	2.00
Duluth, Minn.	.....	2.04
Houston, Texas	.....	2.00
Indianapolis, Ind.	.54¾	2.19
Jackson, Miss.	.....	2.30
Jacksonville, Fla.	.....	2.20
Jersey City, N. J.	.....	2.03@2.13
Kansas City, Mo.	.....	1.92
Los Angeles, Calif.	.60	2.40
Louisville, Ky.	.55½	2.22
Memphis, Tenn.	.....	2.30
Milwaukee, Wis.	.....	2.00@2.20
Minneapolis, Minn.	.....	2.12@2.22
Montreal, Que.	.....	1 36
New Orleans, La.	.....	2.20
New York, N. Y.	.....	1.93@2.03
Norfolk, Va.	.....	2.07
Oklahoma City, Okla.	.....	2.46
Omaha, Neb.	.....	2.36
Peoria, Ill.	.....	2.22
Philadelphia, Penn.	.....	2.11@2.21
Phoenix, Ariz.	.76½	3.06
Pittsburgh, Penn.	.....	2.04
Portland, Colo.	.....	2.80
Portland, Ore.	.....	2.60‡
Reno, Nev.	.....	2.91
Richmond, Va.	.....	2.24@2.34
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.	.....	2.21
Savannah, Ga.	.....	2.50
St. Louis, Mo.	.51¼	2.05
St. Paul, Minn.	.....	2.12@2.22
Seattle, Wash.	.....	2.50†@2.65
Tampa, Fla.	.....	2.25
Toledo, Ohio	.....	2.20
Topeka, Kan.	.....	2.41
Tulsa, Okla.	.....	2.33
Wheeling, W. Va.	.....	2.12
Winston-Salem, N. C.	.....	2.59

NOTE—Add 40c per bbl. for bags.
*Includes sacks.
†10c discount, 10 days. ‡10c discount, 15 days.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Albany, N. Y.	.43¾	1.75
Buffington, Ind.	.....	1.80
Chattanooga, Tenn.	.....	2.45*
Concrete, Wash.	.....	2.35
Davenport, Calif.	.....	2.35
Detroit, Mich.	.....	2.15
Hannibal, Mo.	.....	1.90
Hudson, N. Y.	.....	1.75
Leeds, Ala.	.....	1.65
Lime and Oswego, Ore.	.....	2.70‡
Mildred. Kan.	.....	2.35
Nazareth, Penn.	.....	2.15
Northampton, Penn.	.....	1.75
Richard City, Tenn.	.....	2.05
Steelton, Minn.	.....	1.85
Toledo, Ohio	.....	2.20
Universal, Penn.	.....	1.80

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	Gauging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ¼x32x 36". Per M Sq. Ft.	⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lengths 6'-10'. Per M Sq. Ft.
Arden, Nev., and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u	.....	.....	.....	.....	11.70u	.....	.....	.....
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50	.....	.....	13.50	.....	.....	.....
Des Moines, Iowa	3.00	8.00	9.00	10.00	10.00	10.50	13.50	12.00	24.00	22.00	18.00	21.00	30.00
Detroit, Mich.	.....	.....	.....	.....	14.30o	12.30 m	.....	m9.00@11.00o	.....	.....	.....	.....	.....
Delawanna, N. J.	.....	.....	.....	.....	.....	8.00	.....	9.00	.....	.....	.14½	.15½	30.00
Douglas, Ariz.	.....	.....	6.00	14.50	15.00	.....	18.00	.....	30.00	.....	.....	.....	.....
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	.....	24.55	20.00	.....	.....	.....
Gypsum, Ohio	3.00	4.00	6.00	7.00	9.00	9.00	19.00	7.00	24.50	19.00	.....	15.00	30.00
Los Angeles, Calif.	.....	.....	7.50@9.50	11.50y	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	.....	9.00	13.40	14.40	.....	15.40	.....	.....	.....	.....	.....
Seattle, Wash.	6.00	10.50	10.50	13.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sigurd, Utah	.....	.....	.....	.....	.....	.....	.....	.....	21.50	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
(m) Includes paper bags; (o) includes jute sacks; (u) includes sacks; (y) sacks 15c extra, rebated.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City or shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00		
Cement City, Mich.		5x8x12—55.00¶	
Columbus, Ohio	17.00c@19.00a		
Detroit, Mich.	.16		.18
Forest Park, Ill.	21.00*		
Grand Rapids, Mich.	15.00@16.00a		
Graettinger, Iowa	.18@ .20		
Indianapolis, Ind	.13@ .15†		
Los Angeles, Calif.¶	5¾x3½x12—55.90	7¾x3½x12—65.00	
Oak Park, Ill.	20.00		
Olivia and Mankato, Minn.	9.50b		
Somerset, Penn.	.20@ .25		
Tiskilwa, Ill.	.16@ .18†		
Yakima, Wash.	20.00*		

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton. (c) Plain.

Cement Roofing Tile

Prices are net per sq. in. carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

Red	15.00
Green	18.00
Chicago, Ill.—Per sq.	20.00

Cicero, Ill.—Hawthorne roofing tile, per sq.

	Chocolate, Red, Yellow, Gray, and Orange	Green, Blue
French and Spanish†	$11.50	$13.50
Ridges (each)	.25	.35
Hips	.25	.35
Hip starters	.50	.60
Hip terminals, 2-way	1.25	1.50
Hip terminals, 4-way	4.00	5.00
Mansard terminals	2.50	3.00
Gable finials	1.25	1.50
Gable starters	.25	.35
Gable finishers	.25	.35
*End bands	.25	.35
*Eave closers	.06	.08
*Ridge closers	.05	.06

*Used only with Spanish tile.
†Price per square.

Houston, Texas—Roofing Tile, per sq. 25.00

Indianapolis, Ind.—9x15-in. Per sq.

Gray	10.00
Red	11.00
Green	13.00

Waco, Texas:	Per sq.
4x4	.60

Cement Building Tile

Cement City, Mich.:	Per 100
5x8x12	5.00
Grand Rapids, Mich.:	
5x8x12	8.00
5x4x12	4.50
Longview, Wash.: (Stone-Tile)	Per 1000
4x6x12	55.00
4x8x12	64.00
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Grand Rapids, Mich.:	Per 100
5x8x12	7.00
Houston, Texas:	
5x8x12 (Lightweight)	80.00
Pasadena, Calif. (Stone Tile):	Per 100
3½x4x12	3.00
3½x6x12	4.00
3½x8x12	5.50
Tiskilwa, Ill.:	Per 100
8x8	15.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile):	Per 1000
3½x6x12	50.00
3½x8x12	60.00
Prairie du Chien, Wis.:	
5x8x12	82.00
5x4x12	46.00
5x8x 6 (half-tile)	41.00
5x8x10 (fractional)	82.00
Yakima, Wash. (Building Tile):	
5x8x12	.10

Cement Drain Tile

Graettinger, Iowa—5 to 36 in., per ton	8.00
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile, per ft.:	
3 in.	.04
4 in.	.05
6 in.	.07½
8 in.	.10
Waukesha, Wis.—Drain tile, per ton	8.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@40.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	
Ensley, Ala. ("Slagtex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Forest Park, Ill.		37.00
Friesland, Wis.	22.00	32.00
Longview, Wash.*	15.00	22.50@65.00
Milwaukee, Wis.	15.00	20.00@50.00
Mt. Pleasant, N. Y.		14.00@23.00
Oak Park, Ill.		42.00
Omaha, Neb.	18.00	30.00@ 40.00
Pasadena, Calif.	10.00	
Philadelphia, Penn.	14.75	20.00
Portland, Ore.	17.50	23.00@55.00
Mantel brick—100.00@150.00		
Prairie du Chien, Wis.	14.00	22.50@ 25.00
Rapid City, S. D.	17.00	25.00@ 40.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	20.00	35.00
Westmoreland Wharves, Penn.	14.75	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	

*40% off List.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.								15.00 per ton									
Graettinger, Iowa	.04½d	.05½	.08½	.12½	.17½	.....	.40	.50	.60	.70	.....	.....	.....	.....	.....	.....	.....
Grand Rapids, Mich. (b)																	
Culvert pipe	.....	.....	.....	.60	.72	1.00	1.28	1.60†	.....	1.92	2.32	3.00	4.00	5.00	6.00	.....	.....
Sewer pipe (d)	.....	.....	.....	.....	.....	.63	.....	.60†	.....	.....	.....	.58	.....	.....	.....	.....	.....
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.80	.90	1.10	1.30	.....	.....	1.70	.....	2.70	.....	.....	.....	.....	.....
Longview, Wash.							Sewer pipe 40% off list; culvert—list										
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Newark, N. J.							6 in. to 24 in., $18.00 per ton										
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Olivia, Mankato, Minn.							12.00 per ton										
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Penn.	.....	.....	.....	.....	1.08	1.25	1.65	.....	.....	2.50	.....	3.65	4.85	7.50	8.50	.....	.....
Tiskilwa, Ill. (rein.) (a)	.....	.....	.....	.65	.75	.85	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	1.00	1.13	1.10	1.60	.....	1.90	.....	2.25	3.40	.....	5.50	.....	.....
Yakima, Wash.							1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	7.78
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(a) 24-in. lengths; (b) Reinforced; (d) Eastern clay, list. 72% and 60% off.
†21-in. diam. ‡Price per 2-ft. length.

Prices for Building Materials

AN interesting study of the prices of various rock products in relation to the location of producing points, and to transportation facilities is afforded by a recent bulletin of the Division of Building and Housing of the Bureau of Standards, U. S. Dept. of Commerce. The prices quoted are the average prices paid by contractors all over the United States for building materials delivered to their jobs. For uniformity, prices are given as paid on Oct. 1, 1927 only. For portland cement the lowest quotation is $2.16 per bbl., at Detroit. This low price is undoubtedly brought about by the number of plants in and near Detroit, and by the good water transportation. The middle west shows some variation, the prices ranging from the low marks at Detroit and Bay City, Mich., up to $3.20 at Toledo, Ohio. The east is slightly higher with a low mark of $2.30 at Poughkeepsie, N. Y., and the highest prices at Albany, N. Y., and New Haven, Conn., where quotations are $3.40. Almost the same variation is found in the south where Jacksonville is $2.45 and Shreveport is $3.40. The highest price quoted is at San Antonio—$3.60. Along the Pacific coast the prices are comparatively low ranging from $2.31 to $2.66.

Lime and Sand

Baltimore is low on the quotations for lime, due to the proximity of the number of lime producers in that district. Detroit is only slightly higher, the low price due of course to the nearness of the Ohio limestone district. The prices are $13.00 and $13.20 per ton, respectively. The highest price quoted—$30.00—was at Tucson, Ariz. Prices in the east range from $18.00 to $25.00. Quotations in the middle west are from $15.00 to $21.00 and on the Pacific coast they are much higher, running from $20.00 to $27.00.

Sand prices are much the same throughout the country; ranging from $1.25 to $2.25 per ton generally. The exception is noted in Pennsylvania where prices are much higher, reaching $4.05 at Scranton, For quotations on crushed stone, New England, Ohio, and the Pacific states show approximately the same prices varying from $1.75 to $3.00. Other sections vary greatly, reaching $5.50 at Jacksonville, Fla.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

How a Cement Products Company and a Sand Plant Can Pull Together

Peoria Concrete Construction Co. Shows the Value of Connections with Aggregate Plant

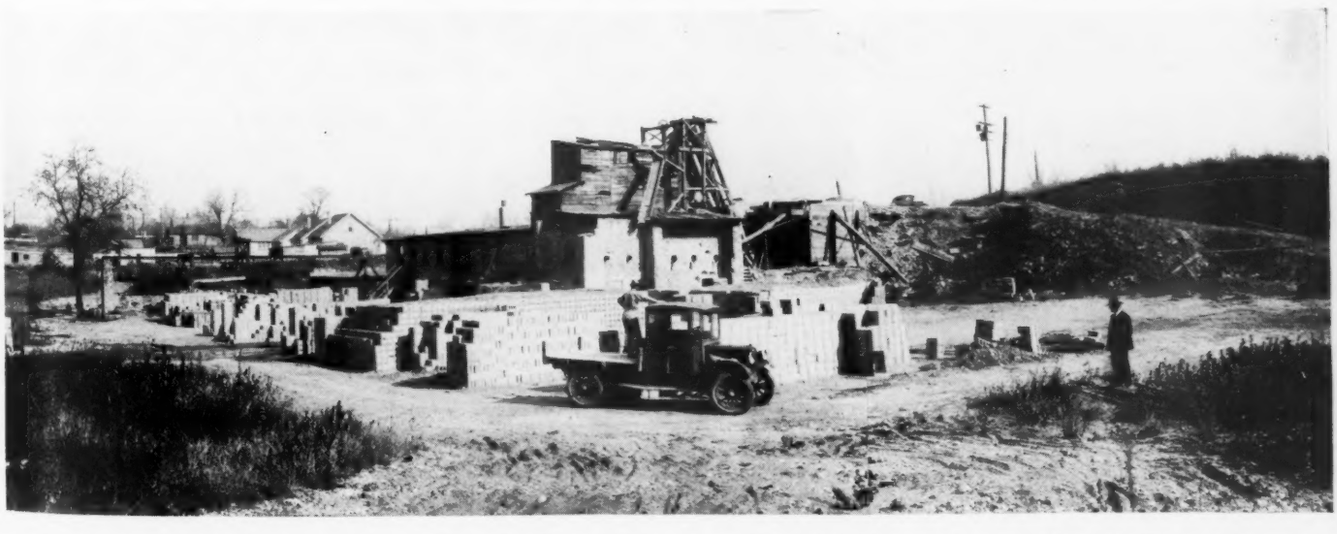
IT is not infrequently that a sand and gravel producer enters into the cement products business as a side-line or by-product of his business, but for a products company to start out to produce its own aggregate is an unusual occurrence in these days. Essentially there is nothing startling about the latter combination; in fact, it seems a very logical step in the production of high quality cement products at low cost. But the fact remains that almost invariably when cement products plants and gravel plants are run in conjunction with each other, the products plant is an after-thought, an addition which is tolerated only because it produces a salable product. There are, however, a number of plants that have made cement products their chief output, and produced sand and gravel only as a means to an end. It is noted in such cases that a market for the gravel has been built up beyond the demands of the products plant, so that larger scale production will bring economy and bigger profits.

The Two Companies

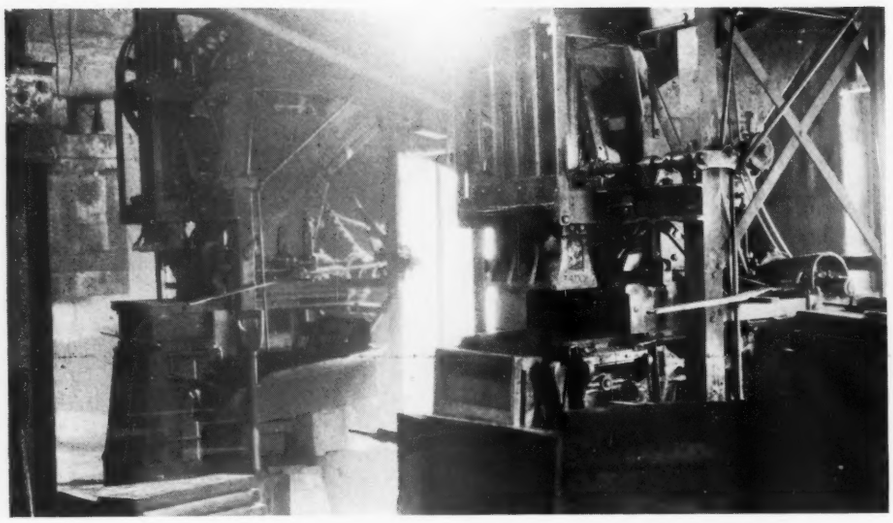
While the Peoria Concrete Construction Co. of Peoria, Ill., does not actually produce its own aggregate, it works with the East Peoria Sand and Gravel Co., at East Peoria, Ill., and each company is complementary to the other. The Peoria company formerly operated a pit west of the city, but when those deposits were exhausted, the East Peoria company was formed to work deposits on Farm Creek, east of Peoria. That the two concerns are closely related is shown by the fact that the president of the products plant is also secretary and treasurer of the gravel company. Through this close relationship the products plant is able to secure a good grade of aggregate at all times. The gravel and sand are washed and graded at the two plants of the East Peoria company and trucked to the products plant by the products company's own trucks. This eliminates all freight charges, substituting, of course, haulage charges, which are small, since the hauling is done when the trucks would otherwise be idle. Add to this the advantage of being able to secure aggregate at the time it is wanted and in the quantity desired, and it is easy to see that this arrangement is certainly desirable both because of the quality of the product which can be made and the economy of production. Securing gravel directly from the deposits is particularly valuable in winter, when long shipping delays mean frozen material. The East Peoria company operates at all times, even turning out aggregate during the past winter when the thermometer stood close to the zero mark.

The Products Plant

The plant of the Peoria Concrete Construction Co. is located in what is known as "the hollow" on the west side of the city. This location is particularly fortunate, since the plant is built directly against the side hill so that the trucks bringing material can dump directly into hoppers on the level of the roof of the plant. This of course elimi-



Cement products plant and storage yard of the Peoria Concrete Construction Co., Peoria, Ill. Note location of hoppers in the rear against the hillside



Two automatic strippers fed directly from mixers on floor above

nates any charge for elevating the material to the bins. In front of the plant there is plenty of level ground for a large storage yard, and to one side a road leads down the hill to this yard. All of the products are trucked out from this yard.

The plant of the Peoria company is one large two-story building of concrete block. The lower floor contains the block machinery at one end, with the steam rooms taking up the balance of the space on that floor. The mixers are directly above the strippers on the second floor, and there is a large room on this floor used for a storeroom, machine shop, pattern shop and general utility room. At the end opposite the mixers is the office of the company. There are four hoppers in the hillside, with tops level with the roof of the building and extending down below the level of the second floor. Beneath the hoppers is the boiler room supplying the steam for the kilns and heating the plant.

Handling Material

The use of gravity for conveying material in the plant is carried as far as is practicable. Since the mixers are on the same level as the bins, it is found necessary, however, to carry the sand and gravel from the large hoppers up to a small hopper on the roof, from which they are allowed to flow directly to the mixers as needed. To elevate the sand a bucket elevator having 6-in. buckets is used. One of the main hoppers is used for bulk cement, and the top is carefully protected against rain by a wood roof and canvas curtains.

Plant Equipment

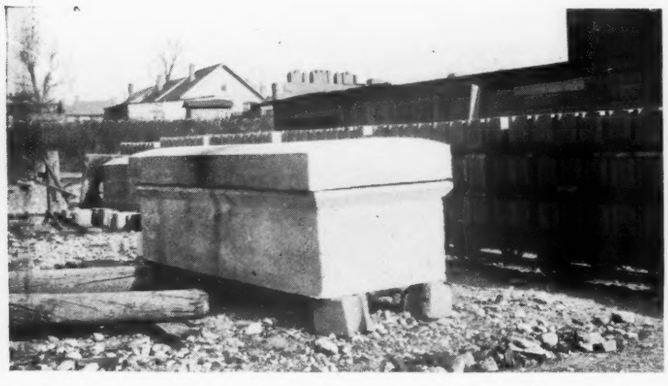
The Peoria company uses one large mixer for general work and a smaller one for making facing. The larger mixer was made by the Blystone Manufacturing Co., Cambridge Springs, Penn., and has a capacity of 9 cu. ft. The other mixer has a capacity of 4 ft. A 5-hp. Westinghouse motor is used to drive both mixers. The mix used by the Peoria company is usually one bag of cement to 5 ft. of sand and pebbles. The latter materials are in even parts.. Some block using haydite, or ground shale, are also manufactured.

The mixed concrete passes to the two Universal face-down strippers on the floor below. These two machines are run by a 10-hp. Westinghouse motor. The block from the machine are placed on narrow Universal cement products cars and run to the kilns, which are only a few feet away from the two machines.

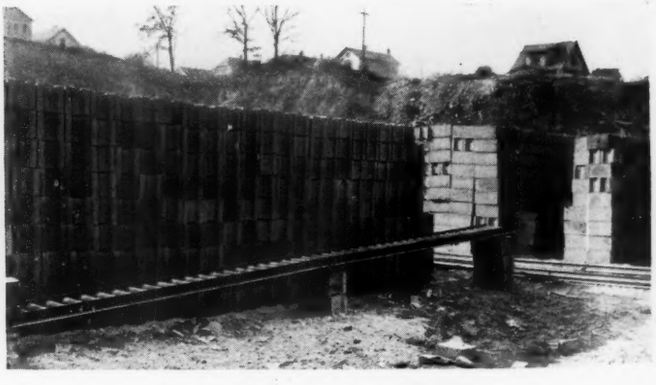
There are five steam rooms, all of which are 100 ft. long. Four of them are 5 ft. wide and contain two tracks each for the

Hopper above mixers filled by bucket elevator from large hoppers at the right

Narrow gage kiln cars used in plant and yard. Note gate post block at right



Heavy construction burial vault



Conveyor for stacking block

Sand and gravel plant of the East Peoria Sand and Gravel Co.

kiln cars. (The gage of the track is only 1 ft.) The other is 9 ft. wide, but it also contains only two tracks. This kiln is used for some of the larger products which the company manufactures. Canvas curtains are made to close the ends of the steam room, and steam is provided by a Clyde boiler.

Cement Products Specialties

The yard has sufficient storage space for all the block turned out by the company and for the other products as well. Besides blocks, concrete building tile and chimney blocks, the company makes a number of other specialties, chief of which perhaps is the concrete burial vault which it manufactures. Although the Peoria company has not attempted to push this product to any great extent, they find there is considerable demand for it in the immediate locality. Another product which is well in demand are blocks for the tops of gate posts. The narrow gage track runs directly through the yard, and for ease in stacking the concrete block a Mathews roller conveyor 30 ft. long is used for conveying them from the cars to the outer edges of the piles. Besides the various specialties manufactured by the Peoria company, the plant turns out on an average of 900 blocks per day.

The company owns two Diamond T trucks and one Reo truck. Usually about six other trucks are contracted for to deliver block and haul the materials.

The Gravel Plant

The East Peoria Sand and Gravel Co. operates two plants, both of which are on Farm Creek in East Peoria. Each plant has an average daily output of 150 yd. of washed and graded sand and gravel. Both plants use a bucket and dragline for removing the sand from the bottom of the creek and delivering it to a point opposite the plant. The operation in either case extends 200 or 300 yd. up the stream.

At the lower plant the sand is drawn from the creek by bucket up a chute and dumped into a hopper at the plant. An iron grating over the hopper prevents large stones and foreign matter from entering it. The sand is then carried up to the screen by a home-made bucket elevator. At the other plant the sand is brought to the hopper by a centrifugal pump.

The screen is placed on top of two large circular monolithic concrete bins. The bins are used for pebbles and sand, while stock piles on either side of the plant furnish storage for two other grades of sand. The sand for each of the stock piles passes down a chute to a home-made dewatering outfit which takes out the water and drops the damp sand to the pile. For carrying sand to the far end of the piles, small dump cars on tracks are used.

Trucks are loaded either from chutes in the concrete bins or from the stock piles by portable bucket elevators. The elevators were made right at the plant.

The gravel plant furnishes all the aggregate for the Peoria company's products plant, but it has also built up a good market for its materials in other directions. Sand and gravel for building contractors in the Peoria district are sold all the year around. It is interesting to note that this company furnishes aggregate for five or six other cement products plants which have no connection with the Peoria company but which recognize the good grade of sand and gravel furnished by the East Peoria company.

Why the Gravel Plant Was Organized

In speaking of the connection between the two companies, George Zeigle, president of the products company and secretary of the gravel concern, asserted that he would not consider running a products plant without having an aggregate plant in conjunction with it. He said it was for this reason that

Bunker at hopper at the foot of elevator to screen

Power plant for operating dragline at sand and gravel plant. Fram Creek at right

George Zeigle

the East Peoria company was formed when the deposits west of Peoria gave out. By thus paralleling the organizations the products plant could, in a measure, control the source of its aggregate and always be assured of the best product and the best service. This has been used as an advertising point to great advantage in marketing the product.

Besides being president of the Peoria company, Mr. Zeigle is in active charge of the operation of the plant. John Zweifel is secretary and treasurer. John Gibbons is president of the East Peoria company and takes the active work of superintending the two plants upon himself. Mr. Zeigle is the secretary and treasurer.

Patent on Glazed Finish Cement Plaque Denied

PATENT 1,641,404 was issued to Irene M. Washington on September 6, 1927, for a concrete plaque and method of making the same, on application filed October 24, 1924. Claims for the process of making the plaque were allowed, but patents on a glazed cement product, as such, were denied.

The claims for a plaque composed of cement having smooth glazed finish with colored pigment incorporated therein were found unpatentable. The full text of the opinion of the Board of Appeals of the U. S. Patent Office is as follows:

This is an appeal from a final rejection of claims 4, 5 and 6. Claim 4 is reproduced as typical of the appealed claims:

4. The product of the herein described process, being a plaque composed of an integral mass of set cement having an extremely smooth glazed plane surface on which a design is reproduced in pigments incorporated in said cement body.

The references cited are:

Britain, 773,709, November 1, 1904;
Chappell, 957,188, May 10, 1910;
Sterner et al. 964,326, July 12, 1910.

Has Smooth Finish

The thing claimed is a plaque or tile formed from hydraulic cement and having a design reproduced in mineral pigments incorporated in the cement body. The plaque is molded with the face thereof in contact with a glass plate and permitted to harden or set in water. As a result of the setting of the cement in contact with the glass plate and in water an extremely smooth glazed plane surfaced plaque is produced.

The examiner has allowed claims for the process by which the plaque is produced, including the step of setting the cement in water with the face of the plaque in contact with the glass plate. All of the essential features of the product claimed are, in our opinion, disclosed in the Chappell and Sterner et al. patents, except the limitation to "an extremely smooth glazed plane surface." Appellant has presented certain exhibits, one of them showing a plaque said to have been made by her process and the others produced by the processes of the Chappell and Sterner et al. patents. The specimens said to have been produced by the processes of the references have smooth plane unglazed surfaces.

Burnt Clay Tiles Similar

The questions presented by the appeal are (1) is appellant's product patentable over the product of the references because it has a glazed surface and (2) can patentability be predicated on the process by which the product is produced, the process being inferentially included in the claims? At the outset we note that plaques or tiles having a smooth glazed surface are not new. No reference is cited showing such a tile, but we may take judicial notice of their existence. These tiles are formed of burnt clay rather than cement. Tiles having smooth glazed plane surfaces being old and a tile formed of cement having a smooth plane surface being shown in the references, it is our conclusion that appellant's product is not patentably new merely because it has a glazed surface.

Our view being that appellant's product is not patentably distinguished from the disclosures of the Sterner et al. and Chappell references, by the inclusion of a glazed surface, patentability of the claims on appeal cannot be predicated on the process, claims for which have been allowed. The decisions to which appellant refers in her brief are not in point, since all of them are based on the theory that the product was inventively new but could be defined only by a recitation of the process by which it was produced.

Atlanta Plant to Manufacture Artificial Stone

ACCORDING to a local newspaper report, J. Clayton Burke, Atlanta realtor and former claim adjuster of the B. F. Goodrich Rubber Co., has announced that he has obtained exclusive rights to manufacture a patented artificial stone and tile, the principal item in which is the compression of wet concrete before it has set, and will proceed at once to establish a plant in Atlanta for this work.

Two hundred plants are now engaged in the successful manufacture of this product in France, and the first of the kind in this country is now under construction at Cleveland, Mr. Burke said.

The patentees of the new process claim that the main difficulty with the usual method of setting concrete is that the evaporation of water during the process of hardening leaves a porous material not nearly so rugged as it would be if solid, and their new method eliminates this difficulty by removing the water before the concrete has become hard. The tile made by the process is said to have great tensile strength and wearing qualities, and Mr. Burke says that it can be produced near a cheap source of aggregate at a cost of 7½ cents per square foot.

Open Georgia Products Plant with Barbecue

MORE than 300 persons, connected with the building business in Macon, Ga., were guests of the Elkan Stone-Tile Manufacturing Co., at a barbecue in celebration of the formal opening of its plant recently. Stanley A. Elkan, president and general manager of the company, was host.

A number of prominent speakers, connected with the manufacture of building products in all parts of Georgia, addressed the gathering, explaining the advantages of the hollow stone-tile over the solid bricks in construction work of all types. The guests were shown how the tile was manufactured.

Australian Quarryman Visits American Plants

R. R. BUXTON, of the Stanley Quarries, Ltd., of Sunshine, Victoria, Australia, is in this country at present and has spent some time studying quarry operations here. Although his visit is primarily a pleasure trip, Mr. Buxton visited quarries in widely separated parts of the United States to get ideas for the Stanley Quarries. He is more interested in the financial side of quarrying, and paid particular attention to installations of equipment such as shovels, crushers, and quarry cars, which would cut down the cost of production for his own quarry. Mr. Buxton was in Europe just before he came to this country, and studied operations in England and Wales also. In company with one of the editors he visited some of the more interesting quarries in Chicago and immediate vicinity.

R. R. Buxton

City Wins Fight for Removal of Gravel Plant

THE long fight which residents of North Riverside, Ore., have been making for years against the gravel plant of the Medford Concrete Construction Co. as a noise maker and alleged nuisance, and which was about to come to a head in a circuit court hearing brought by them against the company to compel the latter to abate the alleged nuisance, is ended and soon there will be no cause for further complaint.

According to an agreement reached at a conference recently between City Attorney J. H. Carkin, representing the city, which was a plaintiff in the suit along with the North Riverside people, the Medford Concrete Construction Co. will remove the offending gravel plant within the next 60 days to a new location on the Ehrhart place south of the city limits, and also agrees to clean up this winter the lots on North Riverside of gravel and sand piles stored there.

By the terms of this agreement the suit to have the rock plant abated as a nuisance, and which was begun about a year ago, will be withdrawn from the courts.—*Medford* (Ore.) *Tribune.*

West Virginia Sues for Gravel Taken from Ohio River

THE largest and most important civil action in which the state of West Virginia has engaged since the historic Virginia debt trials will be started when Attorney General Howard B. Lee begins action toward securing an injunction to halt removal of sand and gravel from the Ohio river without payment of royalties to the state.

The action is based upon holdings of the supreme courts that the bed of the Ohio river "from low water to low water" is held in trust by the state for the people. Under these holdings it is declared by the attorney general that removal of the sand and gravel from the river bed without the payment of royalties to the state constitutes a "looting of this natural resource."

Sand Sold at Auction

SIX lots of sand, to be taken from the bed of the Columbia river at Fishers Landing, Vancouver, Wash., totaling 22,000 cu. yd., were sold recently at auction by Count Auditor Strickling, according to newspaper reports. Application had been made previously to the state land commission for the sand. The appraised value, 10c a cu. yd., was bid for each parcel by the applicants. The sand was sold to the following Portland firms: Nickum & Kelly, 2000 yd.; Diamond O Navigation Co., 5000 yd.; Portland Gravel Co., 5000 yd.; Hackett Digger Co., 2500 yd.; Columbia Contracting Co., 2500 yd.; Star Sand Co., 5000 yd.

Kansas City, Mo., To Have Sand Weighing Ordinance

KANSAS CITY, Mo., is about to join the ranks of progressive municipalities requiring sand, gravel and crushed stone to be sold by weight, instead of the elastic cubic yard. An amusing incident relative to the hearings on the new ordinance is related in the Kansas City *Post*:

"Jules Dumortier, sand dealer, who has decided not to put his trust in a Jackson County Democratic club membership card, appealed to Mayor Beach in his fight against the pending sand ordinance.

"At the city hall Jules concluded that as a fetish, the membership card was about as effective as a rabbit's foot, when it comes to matters affecting the sale of sand. He tore the card into shreds with something like a gesture of disillusionment and disgust. Dumortier is a leader among the independent sand dealers who are opposing the ordinance.

"He changed his skirmish tactics by calling on the chief Republican city official, and with some satisfaction.

"Jules assured that mayor that the pending ordinance would be bad medicine for the small sand dealers. In fact he strongly hinted that the measure was designed to make the independent dealers very ill.

"He advanced a new reason in support of his contention the measure is designed to drive the little fellows out of business. He pointed out that the small dealers almost without exception use Kaw river sand, which is considered the best sand in this territory. The big dealers, he said, use much Missouri river sand.

"Jules pointed out that it would be just as easy for the dealer to give short weight by using his own scales and weighing his own sand, as is the present method of volume measurement.

"The mayor gave some comfort to the indignant Jules by assuring him that he does not favor the section of the ordinance which would force small dealers to go to the expense of installing private scales, sales yards and an office force. He does believe that the weight measure would be more efficient, but is of the opinion the city scales could be utilized for the purpose by those dealers who have no scales.

"Somewhat comforted, Jules departed from the city hall, with the assurance he would be before the council committee with bells on. Which is to say he will be there loaded with information about sand which he says will give the committee members food for reflection before they act on the measure."

Missouri Valley Gravel Association to Meet in December

THE annual meeting and banquet of the Missouri Valley Sand and Gravel Association will be held at the Missouri Athletic Club in Kansas City, December 12 and 13, 1927.

Greenville Gravel Corporation Leases New Indiana Deposit

THE Greenville Gravel Corporation, Greenville, Ohio, has secured a lease on a new deposit of gravel, sand and stone on the Edward W. Hodge and Samuel Hodge farms, of 149.84 acres and 61.83 acres, respectively, in Goshen, south of Mechanicsburg, Ohio.

The lease gives the company the right to mine gravel, sand and stone from either farm upon the payment of a royalty equal to a cent a ton. The lease is for ten years with privilege of an additional ten years leasing. The company agrees to mine at least 50,000 tons a year for the first three years and 100,000 tons a year after that during the life of the lease.

The company is privileged to abandon the land upon discovery that the materials expected are not found in sufficient quantities to justify the continuance of operation providing, however, it pay the owner the minimum royalties provided for. The company can also purchase at $150 an acre, all the land it desires, getting credit for whatever royalties may be paid in before the time of purchase. The company must, however, purchase at least 61 acres.

While the company is employed in mining the materials, any part of the farm not affected can be cultivated by the owner.—*Dayton* (Ohio) *News.*

Kansas Town Turns to Washed Gravel for Street Surfacing

EVIDENCE that the agitation and educational work of the National Sand and Gravel Association and of other agencies for use of washed and cleaned sand and gravel is taking hold, even in remote localities, is attested by the following news item from the *Hanover* (Kan.) *Democrat*:

"An agreement was reached recently between the city council and John Westover, in which the city contracted for 1000 loads, or 1500 cu. yd. of washed gravel, to be ready for delivery November 1. This gravel is to be free of all quicksand and dirt, since it is to be washed and screened by Mr. Westover at his pits west of town. The washed gravel will be used as a finish to some of the main streets of the city that were graveled in the first graveling project carried on by the city last spring. After considerable investigation by the council it was thought best to use washed gravel for the surface coating, as it will be somewhat coarser than unwashed gravel. The date for delivery was set at November 1 so as to give the city a chance to get the gravel spread on the streets before the first freeze, insuring better retention of the gravel to the street and reducing the danger of washing to the lowest possible minimum."

Casparis Stone Plants Sold by Receiver

ALBERT H. MERRILL, Cincinnati, recently purchased the properties of the Casparis Ohio Quarries Co. at a receiver's sale for $23,000. The properties are located at Melvin, Ind., and Greenfield, O.

Halt Pennsylvania R. R. Main Line Trains for Quarry Blast

THIRTY THOUSAND pounds of dynamite were exploded at the quarries of the Pennsylvania Glass Sand Co. near here recently. Three hundred thousand tons of silica rock were hurled down in the blast.

The quarries are located between Mapleton and Fall Creek and the blast was the result of six months preparation. First a tunnel was drilled in the face of the quarry for 65 ft. At the end of this tunnel two branches to right and left were drilled. Each of these branches were 75 ft. long.

The work of placing the dynamite in these tunnels was completed and about 6 o'clock p. m. was ready for the blast. State police patroled the highway that runs near the quarry. They stopped all motorists from driving into the danger zone.

On the main line of the Pennsylvania railroad, which also runs past the quarries, signalmen were stationed with orders to stop all trains when the blast was due to go off. These tracks are the main line from Harrisburg to Altoona.

When the signal of "all clear" was given the switch was pushed in and with a muffled roar the cliff crumbled. About 300 persons watched the blast from a safe distance. The dynamite was so well placed that no heavy particles were thrown 150 feet from the quarry. The highway runs that close to the workings and none of the debris reached it. —*Harrisburg* (Penn.) *Patriot.*

Wisconsin Mineral Aggregate Association Meets in December

THE ninth annual meeting of the Wisconsin Mineral Aggregate Association will take place in Milwaukee, December 7 and 8, at the Astor hotel. The meeting, covering two days, will begin Wednesday morning in the form of registration and getting acquainted with a welcoming luncheon at noon.

Wednesday afternoon, Thursday morning and Thursday afternoon, will be devoted to papers and discussions of interest to the industry, closing Thursday evening with the dinner dance and entertainment as in former years.

In connection with this two day session, representatives of machinery and allied interests will be present with exhibits of literature and in some cases, small working machine models.

Gravel Company Adopts Novel Method to Avoid Switching Costs

AN aerial tramway from the loading pit of the Western Sand and Gravel Co., Spring Valley, Ill., to a newly constructed switch on the Chicago & North Western railroad tracks will be erected some time during this winter, according to plans now formulating in the gravel company's office. The need of such an outlet for gravel and sand shipments has been felt for some time and the adoption of the plans for the new tramway seemed the best possible solution of the difficulty.

The pit is located along the branch line of the Chicago, Burlington and Quincy railroad, east of Spring Valley, and all distant shipments have been made over this line in the past. In shipping sand and gravel to points not reached by the "Q" line the rate has raised the price of the Western product so as to take it out of competition with other companies on a direct route.

This transferring from one road to another increased the cost of sand and gravel about 60 cents per ton, which placed the local company's product above other bids.

A switch capable of receiving about 35 cars has already been constructed by the Northwestern railroad a short distance south of Route 7. A large tower will be erected alongside of this switch, another midway between the two points which will be a short distance east of Spring Creek, while a third is to be placed near the pit at the loading point. Heavy cable stretched between these supporting towers will convey two buckets, one going over loaded while the other is returning empty. It is estimated that this apparatus will be capable of transporting 125 tons of sand and gravel per hour from the pit to the cars in the switch.

The Western Sand and Gravel Co., which was incorporated in 1908, now sends products to all parts of the state of Illinois. With the completion of this new shipping point a larger field will be opened up and the company will be able to compete with other such concerns to the northwest.—*Spring Valley* (Ill.) *Gazette.*

Gravel Not From a Navigable Stream Private Property

THE case of W. C. Webb against the board of county commissioners of Neosho county, Kansas, has had its final hearing. The supreme court has refused to grant a rehearing of the case. This was a test case in which Webb sued the county for river gravel taken from his place. He asked for $568 and was granted a judgment in district court. The county appealed the case on the grounds that the gravel belongs to the county. The higher court sustained the verdict. The county then asked the supreme court to reopen the case. That body refused to grant the rehearing.

Action was started some time back by Webb and the case has been in the courts for two or three years. In its final disposition of the matter, the supreme court thinks the Neosho is not navigable and rules that the gravel belongs to the property owner, rather than the county.

A $20,000 Gravel Plant Sold for $1906 Plus $2 for Real Estate Mortgages

THE real estate, machinery and stock of the Monmouth Washed Sand and Gravel Co., Inc., at Jerseyville, N. J., was sold at auction at a receiver's sale recently.

The machinery and stock brought a total of $1906. Part of this amount was paid by local buyers, but the majority of the machinery was purchased by out of town interests. First and second mortgages on the property involved were purchased by the holders on bids of $1 each. The first mortgage, for $9000, is held by William W. Nichols, of Jerseyville, and the second, for $8000, is held by Frank A. Federici, of Freehold. It is the intention of the purchasers to sell the land at the earliest possible time.

The company was organized February 1, 1927, and commenced business on the 15th of May. The local news dispatch does not say how long it continued in business—evidently not long.

Safety Council Quarry Section Sends Out News Letter to Producers

WORKING under the direction of D. C. Souder, chairman of the Quarry Section of the National Safety Council, D. B. Buettner, Jr., of the France Stone Co., Toledo, Ohio, has gotten out the first "Quarry Section News Letter." Subsequent letters will be sent out from time to time by Mr. Buettner in the interests of safe quarry practice, and will give safety helps and information to quarry operators over the whole country.

The present letter is an interesting and helpful sheet, giving news of the progress of the safety campaign in the United States, and calling attention to dangers in quarries due to the change of season and other causes. The extracts of the report of a quarry safety committee are particularly enlightening, showing as they do the real interest which the men are taking in the safety campaign. There can be no question but that these letters will do a real service in keeping the safety cause alive in the minds of quarry operators, and we hope that they will appear frequently in the future. They are sent out by the National Safety Council, Chicago.

Canadian Lime Production in 1926

LIME producers in Canada during 1926 shipped 11,825,736 bushels, valued at $3,781,484, an increase in quantity of 15% over the previous high mark for the industry, viz., 10,256,542 bushels, valued at $3,387,652, shipped in 1925. These figures are shown in a report containing finally revised statistics issued by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa.

TABLE I. PRODUCTION OF LIME IN CANADA IN 1926

	Quicklime		Hydrated Lime		
	Quantity Bushels	Value	Quantity Tons	Value	Total Value
Nova Scotia	446,626	$ 56,777	251	$ 3,000	$ 59,777
New Brunswick	477,226	196,477	.....	.....	196,477
Quebec	2,509,006	667,480	11,922	98,636	766,116
Ontario	5,402,261	1,593,468	39,217	457,978	2,051,446
Manitoba	498,875	147,401	6,528	103,868	251,269
Alberta	108,309	39,517	.....	.....	39,517
British Columbia	503,033	317,733	7,896	99,149	416,882
Total	9,945,336	$3,018,853	65,815	$762,631	$3,781,484

TABLE II. PRINCIPAL STATISTICS OF THE LIME INDUSTRY IN CANADA, 1925-1926

	1925	1926
Number of plants	62	60
Capital employed	$5,154,046	$5,825,809
Number of employes on salary	89	89
Number of employes on wages	917	1,017
Salaries	$145,983	$157,950
Wages	$814,451	$924,904
Cost of fuel and electricity	$762,814	$788,990
Selling value of products	$3,387,652	$3,781,484

Lime importations into Canada decreased 17.7% in 1926, to a total of 110,509 bushels, valued at $42,855. Exports were recorded at 534,618 bushels, valued at $344,616.

The capital employed in the sixty plants operating in 1926 amounted to $5,825,809. There were 89 employes under salary and 1,017 wage earners. Their earnings totaled $1,082,854. Fuel for the year cost $738,918. Electric current cost $50,072. The primary power in 31 units were rated at 1143 hp. Electric motors were rated at 3250 hp. Table I shows the lime production by provinces and Table II gives some of the principal statistics of the lime industry for 1925 and 1926.

Briar Hill Stone Company to Open New Quarry

THE Briar Hill Stone Co. is opening up a second large quarry in the heights above the bridge at Cavalo, near Millersburg, Ohio.

Undoubtedly the company is spending thousands of dollars in making this location, but an inspection of the wonderful rock formations located beneath the sod reveals the fact that there is also a wealth of "stone-gold" there.

The incline up the hill, a distance of 1050 ft., has been completed, and workmen are now busy on the track into the pit, and the quarry shop and engine house. It was indicated recently by one of the company men that actual work in this quarry would not likely begin before early spring. The winter months will undoubtedly be used in clearing off the rock formations and getting ready for real work later on.

One of the new and unique installations at this plant is a huge cable brake drum, perfected and built by Thomas Ashworth, proprietor of the Millersburg Machine Co.—*Millersburg* (Ohio) *Farmer*.

Boys Must Not Be Employed in Quarries—Not Covered by Liability Insurance

WORKERS who are employed contrary to law are not covered by workmen's compensation laws, the United States Supreme Court ruled in the case of the Campbell Contracting Co. against the Maryland Casualty. Ovid Stone, a boy between the ages of 14 and 16, was managing a hoist and doing odd jobs about a quarry of the Campbell concern located in North Carolina. The laws of that state rule that children of that age may not be employed in a quarry.

Stone was injured. He sued and won a judgment from the contractors for $8500 and costs. The casualty company refused to pay on the grounds that the boy was employed contrary to the law and that they were therefore not liable. After discussion, as to whether or not the boy was wrongfully employed, the court found that he was, and that the contractor, rather than the indemnity, was liable.

Wisconsin to Buy Cement for Local Municipalities?

A NEWS item in the *Madison* (Wis.) *Times* states that it has information that certain cement companies are the instigators of a plan to have the state cement purchase board buy cement from the cities, counties and villages of the state.

It is contended that if the state buys the cement for the cities and villages from the cement companies these companies can entirely wipe out the sales cost on this cement. This would make possible a reduction in the selling expense.

It is also reported that the cement companies are behind a scheme whereby the state should buy all the cement used by the state for all public work, instead of having it bought by the contractors who do the work for the state. For the last two years the cement has been bought by the contractors who have done work for the state and the local communities on the contract basis, and the cement companies have had to sell their cement to the contractors.

This, it is said, has caused a high sales cost. The cement companies want the state to buy all cement used on all public work, so that they can wipe out the sales cost on all cement which is used on construction work done for the state and also the local communities.

It was stated at the meeting of the highway commission recently by H. J. Kuelling, state highway engineer, that the cement purchase board was attempting to work out some plan whereby the cement purchase board would buy the cement for the local communities.

Mr. Kuelling claimed that this plan was being worked out so that the cities would be able to buy cement for a lower price. He contended that the local communities were now paying 10 to 35 cents more per barrel for cement than the state, and that cement dealers were forming "pools" in the cities so that there would be no competition, and they could increase the price. Mr. Kuelling claimed that if the state bought the cement there would be competition.

Protection of Concrete Against Alkali, Tar and Paraffin Treatments

THE investigations carried on for some years by the Bureau of Public Roads to determine the degree of protection against alkali attack afforded by treatment of concrete with tar and paraffin have been continued, and additional information has been gained regarding the physical properties of the preservatives and their behavior when applied to various types of concrete. The results of these later tests have been published in the August, 1927, number of *Public Roads* and from data gathered on laboratory and field specimens, the following conclusions are drawn:

1. That water-gas tar of the proper quality is readily absorbed by cement mortar and concrete, the rate of absorption varying with the manner of curing, age and density of the mix. Concrete of a 1:3:6 mix cured, respectively, 48 hours and 7 days under moist conditions in the forms followed by 7 days' exposure to dry air, was found to be the most absorptive, while a 1:1½:3 mix, cured 7 days in forms and 83 days in air, was the least absorptive.

2. That the absorption of coal tar by concrete is similar to that of water-gas tar except that the quantity absorbed increases with the time of exposure after treatment with water-gas tar.

3. That a treatment consisting of 4 coats of water-gas tar applied at the rate of about one-fourth gallon per square yard of surface, followed by one coat of coal tar appears to afford adequate protection against alkali attack, provided the concrete is of good quality, has been properly fabricated and not leaner than a 1:2:4 mix.

New Machinery and Equipment

Combination Truck and Concrete Mixer

A NEW combination truck and concrete mixer has been recently brought out by the Transit Mixers Co., Inc., San Francisco, Calif., for use in delivering ready-mixed concrete to any job.

Combination truck and concrete mixer for delivering ready-mixed concrete

The new mixer, known as the "Paris" mixer, is of the rotating type, and comprises an elongated revolving cylinder shell with one end closed and the other containing a funnel-shaped opening through which aggregates enter and discharge. The interior is so arranged through a patented set-up of blades, brakes and baffles that a homogeneous mix can be quickly produced at the job, the manufacturers say. Water is carried in separate tanks on both sides of the mixer and the connection is such that it can be readily released to the interior when the wet mix is desired. All controls for both water and mixer are operated from the driver's seat. A touch of the levers by the driver, either standing or while the truck is in motion, starts operation of the cylinder. The body of the mixer rests in a cradle suspended from the supplemental frame of the mixer and rotates in either direction for loading or dumping.

In loading the mixer at the batching plant, the truck is backed to the bunkers and while the aggregate is being poured in, the shell is rotated so as to mix the dry batch, after which it is ready to receive the water on the job. A wet mix of concrete may be prepared and dumped within two or three minutes after reaching the job, the manufacturers claim.

New Automatic Scale Weighs and Proportions Materials

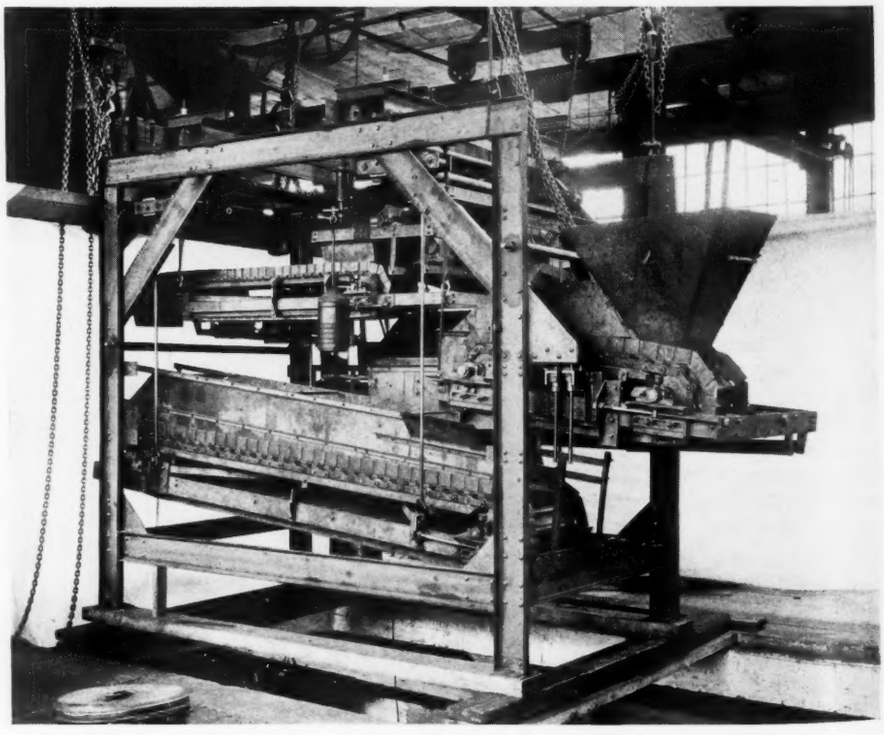
A NEW type of automatic scale, for use in weighing both the raw mix and clinker-gypsum proportions in the finish end of cement manufacturing has been brought out by the Richardson Scale Co., Clifton, New Jersey. It is a development of the belt-feed system, the usual weighing hopper being replaced by a weighing belt or conveyor. The features of this machine, with particular reference to proportioning clinker and gypsum in a regular stream of both materials, are brought out further in the manufacturer's description which follows:

The machine consists of a feeding belt or conveyor which is either a heavy rubber belt for cold materials or a steel apron for hot. This feeder is run at a slow speed by motor through totally enclosed standard gear reduction units. It discharges its stream onto another conveyor which, with its driving motor, is suspended from a system of scale levers. This weighing conveyor contains the load to be weighed but runs continually and is driven in a manner similar to that of the feeder.

When the scale is set for a definite amount of material the feeder runs until it has delivered this quantity. Then a totally enclosed mercury switch operated by the rising scale beam cuts out the feed motor and the feed consequently promptly stops. The weighing conveyor, however, continues to run, discharging its load (which has been registered on a counter), thus once more allowing the scale beam to reset the switch and restart the feed for the next weighing. The intervals between the weighments are distinct but are kept as short as is feasible.

The batches come off the weighing belt in a succession of elongaged discharges fed off at the rate of about 30 ft. a minute, rather than in a dump. This feature is of advantage in the case of cement work, both in the raw mix end and the clinker-gypsum end. By so disposing the scales where proportioning is involved the two streams can mingle together upon discharge. This is especially valuable in the clinker end where it is desired to spread the gypsum out upon the whole length of the clinker. Combinations of clinker-gypsum are so timed to do this and the illustration shows such an arrangement. In this case the clinker scale has a capacity of 75 tons an hour and the gypsum 2% to 5% as desired. By a single change of scale weights combinations of mix can be changed at will.

In the 1000 lb. clinker scale illustrated the weighing conveyor has a width of 2 ft. and is the steel apron type. The feeding



Automatic scale for weighing and proportioning material, showing weighing belt

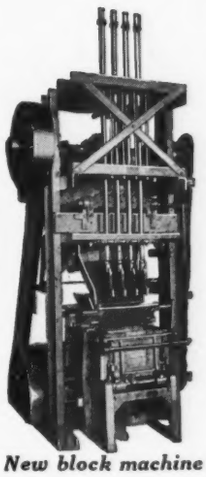
conveyor is 18 in. wide. The gypsum scale is also built with steel apron and has a feeder 12 in. wide and weighing conveyor 12 in. wide. The wide feeder in this case is provided to ensure wet gypsum feeding from the storage hopper at all times. The entire machine is electrically controlled. All conveyors are motor driven and all motors are wired and connected by mercury switches so that their stopping and starting is controlled entirely by the act of weighing, the manufacturers say. Sufficient feed is ensured by a novel mechanism, it is said, which is controlled by either scale in making a combination mix. The scale can be stopped at any time from the press button main line control. An electric recorder may be attached through which a graphic record of the materials passing through the scale can be obtained. By a simple connection a signal light can be attached to the feed hopper so that when running out of material the signal can be flashed where it is needed.

The machine can be arranged so that the conveyors are at right angles or one above the other or in line. They can also be either in horizontal position or inclined to any safe conveying angle. The operation of the scales is said to create little dust.

New Cement Block Machine

A NEW model of the "Hobbs" face-down power automatic block-making machine which is said to embody many new features is announced by the Anchor Concrete Machinery Co., Adrian, Mich. The new machine, the "Big Boy" is said to be capable of producing from 1200 to 1300 faced blocks per day under average working conditions. Rock, gravel or plain cement block up to 8x12x16 in. solid or standard oval type or two-core type and with any amount of air space can be made by this machine, the manufacturers say. Corner blocks either single or double and fractional blocks can also be produced through the addition of various attachments.

The power mechanism is built into the one-piece frame so that the only outside connecting unit is the main drive chain.



New block machine

Design is such that either floor type or suspended type tampers can be used. The fixed ends of the mold box are lined with replaceable steel plates. All other parts are of sturdy construction with protected wearing strips. The machine can be installed by fastening it to a formation and connecting the drive chain. With a power feeder the entire block making process moves automatically.

Electric Dial Scales

A NEW type of electric dial scales has recently been introduced by the Standard Scale and Supply Corp., Pittsburgh, Penn. The new scale incorporates the principle of a chemist's laboratory scale, with an electrically operated poise shift which automatically strikes a balance. An accuracy within 1/70 of 1% is claimed for the device. This scale is adaptable to any type of heavy duty beam scale.

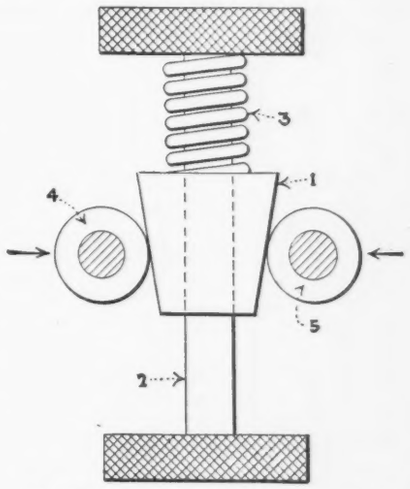
New Crawler Shovel

A NEW "Skimmer Scoop" with added features has recently been placed on the market by the Speeder Machinery Corp., Cedar Rapids, Iowa. The new features comprise a high and low speed on the drums as well as on traction, a patented bucket trip, a traction lock and a bucket that dumps from the back instead of the bottom.

The patented trip on the bucket is designed to eliminate the trip rope and permit the bucket to be dumped from any angle, the manufacturers say. The back-dump feature is said to give a greater dumping clearance. The "Skimmer Scoop" embodies all the other Speeder features and the change to the Skimmer from any other Speeder attachment is accomplished by simply changing the boom and reweaving the cables. It is full revolving, caterpillar mounted, giving a good work-range and permitting wagons and trucks to be loaded from the rear without any difficulty.

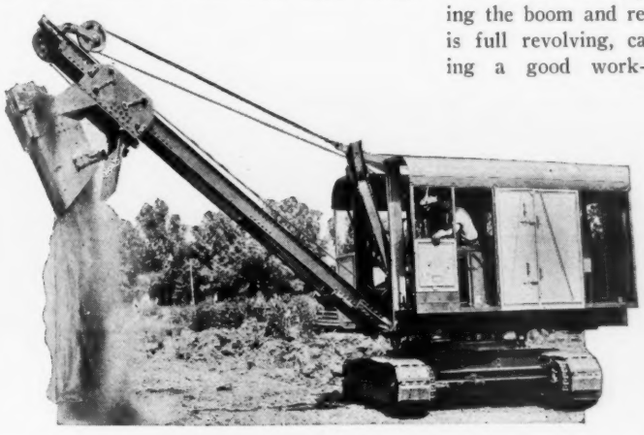
Automatic Backlash Eliminator

THE Bethlehem Steel Corp., Bethlehem, Penn., announce a new development, the Bethlehem lashlock (Niemen patents) for elimination of backlash. It is said to be successfully applicable for this purpose to a wide range of machinery and equipment such as gear wheels, feed screws, endthrusts, bearings and wherever play occurs between moving members. It also compensates for wear, and automatically relieves strain caused either by tight setting or expansion due to heat. Action of the lashlock is said to be positive, without slip or yielding under load, and in no way to lessen the power which can be transmitted or weaken the members to which it is applied. Entirely automatic, it never requires hand adjustments, and needs only the minimum of lubrication, it is said.



Details of new automatic backlash eliminator

The basic principle of the lashlock will be seen from the accompanying sketch. A wedge-shaped member, *A*, slides on a stem, *B*, and is urged downward by the light spring *C*. Two rollers, *D* and *E*, are disposed so that they press against the wedge, as shown. It is obvious that if both rollers press simultaneously against the wedge it will be forced upwards, readily overcoming the pressure of the light spring.



New type of crawler shovel, with bucket which dumps from back

Full-revolving caterpillar crawler shovel with new type of trip on bucket

News of All the Industry

Incorporations

Wick Lime Co., Newcastle, Penn., $30,000.

Jackson Gravel Co., Wilmington, Del., 200 shares no par.

Canadian Granite Quarries, Ltd., Toronto, Can., $150,000.

Limestone Calcium Products Co., Limestone, Ohio, $500,000.

Wamego Sand Co., Wamego, Kan. To produce and deal in sand.

Shoot Sand and Gravel Corp., Woodstock, Ont., Can., incorporated.

Carleton Concrete Brick Co., Ltd., Ottawa, Ont., Can., $50,000.

California Stucco Co. of British Columbia, Ltd., Vancouver, B. C., $15,000.

Bay View Crushing Co., Biloxi, Miss. W. L. Guice and J. S. Wheatstone.

Sand-Gravel Co., Omaha, Neb., increased capital stock from $65,000 to $100,000.

Sturgeon Bay Co., Wilmington, Del., $500,000. To deal in limestone and other minerals.

Innerkip Lime and Stone Co., Ltd., Woodstock, Ont., Can., $50,000. To deal in limestone.

St. Lawrence Quarry, Ltd., Giffard, Que., Can., $49,500. To deal in stone, sand, cement, etc.

Maritime Gravel Co., Ltd., College Bridge, Westmoreland County, New Brunswick, Can., $10,000.

Louisiana Cement Products Co., Inc., New Orleans, La., $100,000. To deal in cement, brick, tile and clay.

St. Helena Sand and Gravel Co., Shively, Ky., $15,000. Wm. B. Thomas, A. J. Huber and Carl L. Bess.

Crowe Lime and Cement Co., Amarillo, Tex., $30,000. E. L. Roberts, U. N. Oliver and C. T. Crowe.

Canada Lime, Ltd., St. Marc des Carrieres, Portneuf County, Que., Can., $20,000. To deal in lime and build lime kilns.

Hernando Crushed Stone Co., Brooksville, Fla., 50 shares, par value $100 each. J. J. De Gunther, D. B. Gore and L. C. Flisch, board of directors.

Arkansas Asphalt Co., Little Rock, Ark., $1,600. G. B. Rose, 314 W. Markham; W. W. Dickinson and Moorhead Wright, 3518 Hill Road, Little Rock.

California Stucco Products of New Jersey, Rutherford, N. J., $8,000. George V. Reilly, Samuel C. Wood and William M. Stevens of New York City.

Auburndale Sand Products Co., Auburndale, Fla., $32,000, divided into 320 shares, par value $100 each. To deal in sand. M. C. Dopler, N. J. Dopler and L. H. DeGreaf.

Columbia Gravel and Sand Co., Columbia, S. C., $25,000—250 shares of $100 each. B. F. Johnson, president; M. A. Tydings, vice-president; C. H. Gerald, secretary, and C. L. Packard, treasurer.

East Angus Brick Co., Ltd., East Angus, district of St. Francis, Que., Can. To deal in brick, cement blocks, etc.

Quarries

Glendora Rock Crushing Co., Glendora, Calif., has established a plant with H. J. Sparks in charge.

Andrews Quarry, Biddeford, Me., which has not operated for several years, will be reopened in the spring, according to George W. Andrews, Jr., of Vernon, Conn.

Pond Hill Crushed Stone Co., Pond Hill, Penn., will erect a machine shop at their plant, the equipment to include a lathe and a drill press, as well as other machinery.

Crystal Gray Marble and Lime Co., Knoxville, Tenn., is being reorganized, according to James F. Boyd, who is interested in the business. A charter has been secured and the company will begin operations again.

Union Rock Co., Los Angeles, Calif., operating a group of eleven rock crushing plants and other properties, has arranged for a bond issue of $2,500,000, a portion of the fund to be used for expansion.

Bromide, Okla. A new rock crushing plant with a daily capacity of 40 carloads of limestone has recently been installed here by Dolese Bros., Chicago, who operate a number of plants in different sections of the country.

Graham & Christ Granite Co., Salem, Ohio, according to reports, has been taken over and will be operated by Clyde Bryan, former manager of the plant. Mr. Bryan formerly owned the business, having sold it to Graham & Christ three years ago.

Montpelier, Ind. A representative of the France & Erie Stone Co. recently visited Montpelier to investigate various farms near the Nickel Plate R. R. It is reported that the company is contemplating the operation of a stone quarry here next spring.

Sturgeon Bay, Wis. According to reports a representative of the Valley Camp Co. was here recently to look over the Washington quarry near the Government Bluff. The quarry has not been operated for the past five or six years, and is valued at approximately $16,000.

Barnesville, Ohio. Sam Fowler reports that $2200 has been pledged toward a fund of $4000 which he is trying to raise to promote a crushed limestone operation here. Option has been taken on limestone acreage on the Harry Dew farm, north of Barnesville, where it is proposed to establish a quarry and install a crusher.

Brownell Improvement Co., Chicago, Ill., is enlarging its facilities by the purchase from the Chicago Title and Trust Co., as trustee of, a block of ground between Seventy-fifth and Seventy-sixth Sts., and Claremont and Oakley Aves., Chicago. This property, now vacant, is to be used as a material yard, and the erection of a small office building is also contemplated.

Chico Stone Products Co., Dallas, Tex., is offering $200,000 10% prefered stock through Industrial Securities Co. The proceeds derived will be utilized as follows: Balance on plant purchase, $82,500; lime kiln and hydrating plant, $30,000; retirement of preferred stock now outstanding, $42,000; operating capital and other purposes, $65,000. The company owns and operates two large quarries and rock crushers in Wise County; also 2½ miles standard gage railroad connecting with the Rock Island R. R. and Fort Worth and Denver R. R.

Sand and Gravel

Los Angeles, Calif. S. N. Pierson and Edmund W. Grown are engaging in the sand, gravel and crushed stone business at 4122 Verona St., Los Angeles, under the name of Pierson & Son.

Flint Crushed Gravel Co., Des Moines, Iowa, has leased 190 acres of land in Madison County, Iowa, one-half mile east of Winterset. It is thought the company will open up a plant there.

Columbus Gravel Co., Columbus, Ind. Work on the new concrete block office building and concrete products plant now being erected on the company's ground south of Columbus, Ind., is nearing completion.

Milford, Mich. The new gravel plant, owned by E. F. Foster, will soon be ready to operate. The plant includes a 50-hp. motor, a centrifugal pump, an intake pipe from the water to the pump, and a discharge pipe from the pump to the elevated tank on the storage bins.

Pacific Rock and Gravel Co. Centerville, Calif., has been organized by Lee Frontz of Pleasanton, Calif. The company will operate on the Mickle and Lowrie ranches near Centerville. Capital has been subscribed by local men and construction of a plant is planned for the immediate future.

Perkins Sand and Gravel Co., Calvert, Tex. Jess Perkins, president, advises that in addition to their Marion shovel located in the Rio Grande Valley, west of Mission, and a Marion dragline south of Calvert, loading ballast for railroad purposes, they will have a modern gravel plant in operation at Bufkin by December 1. A 500-hp. Allis-Chalmers twin Duplex Diesel engine, direct connected to generator, will supply the power for the plant, which will consist of a 10-in. hydraulic heavy duty sand and gravel pump, direct connected to a 250-hp. motor located on a dredge boat 24x55 ft. Sand and gravel will be pumped with this unit to the screening and washing plant;

Cement

Consolidated Cement Corp., Chicago, Ill., has moved the sales and accounting offices of its Cement City branch to rooms on the fifth floor of the Carter Block in Jackson, Mich.

Commonwealth Portland Cement Co., Wilmington, Del. Incorporation notice published in ROCK PRODUCTS of September 3. The following are the incorporators: Herman M. Diamond, 2 Lafayette St., John F. McGovern and Grace L. Cotterill of 31 Nassau St., all of New York City.

Phoenix Portland Cement Co.'s plant at Birmingham, Ala., was visited recently by the students of the Wheeler Business College in a tour of Birmingham industrial plants which the college has scheduled for the students. The students inspected the plant and were shown cement in the making.

Cement Products

Whittier Tile Co., Whittier, Calif., has been established by E. W. Ekstrand.

Boyd & Hutter Tile Co. has established a plant at 1375 Wilmington Blvd., Long Beach, Calif.

American Mosaic and Terrazzo Co. has established a plant at 1807 E. Ninth St., Los Angeles, Calif.

California Concrete Pipe Manufacturers' Association will hold its quarterly convention at Lodi, Calif., on January 20 and 21.

Fairmont, Minn. J. J. Welch, for the past 24 years in the stucco business at Austin, Minn., is establishing a branch, to be known as the Fairmont Stucco Co., in Fairmont, Minn.

Conrock Pipe Co., Brooksville, Fla., has completed the installation of machinery at its plant and had already begun production. The plant has a capacity of about 1000 tons of pipe per month. R. W. Higdon is president.

Duluth Concrete Manufacturing and Supply Co., Johnson Bros., and the concrete products plants of Peter Eastman, Peter Highmark and Norman Bros., of West Duluth, Minn., were visited recently by members of the West Duluth Cosmopolitan Club and other business and professional men of the district in a tour under the auspices of the industrial contact committee of the West Duluth club. Interesting demonstrations of machine and hand work in producing concrete products were given at the plants for the visitors.

Asphalto-Concrete Corp., Long Island, N. Y., held a meeting of its board of directors in New York City recently, when the following were elected as members of the executive committee: A. P. Lundin, New York, president; R. W. Mitchell, Montreal; D. H. McDougall, Toronto, and J. L. McSweeney, Montreal. According to reports, the company controls the rights for the United States for manufacturing concrete sewer and water pipe by centrifugal process under the Moir-Buchanan and Bille Ligonnet patents.

Silica Sand

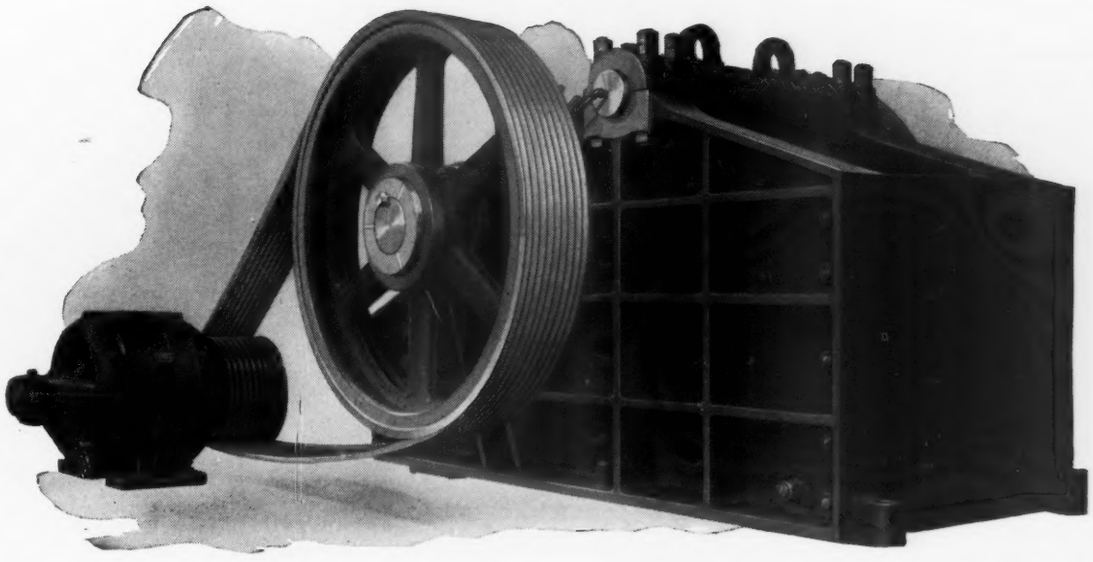
Canada Glass Products Co. has purchased the property and plant of the Silica Sand Co. east of Eastview Park, near Kingston, Ont., Can., and will erect a large new plant on the site.

Wilmore, Comanche County, Kan. It is reported that there are large deposits of silica sand in the territory near Wilmore and that a corporation has leased 40 acres of land here on which they estimate there are 171,000 tons of sand. It is said that the sand, which is found from 2½ to 5 ft. beneath the surface soil, the deposit being from 8 to 18 ft. thick, is being removed at the rate of 10 tons an hour.

Lime

Orcas Island Lime Co., Bellingham, Wash., is reported to be making improvements at its plant at an expenditure of $10,000.

Roche Harbor Lime and Cement Co. of Roche



**150 H. P. Allis-Chalmers Texrope Drive
From Allis-Chalmers Motor to
Allis-Chalmers All Steel Jaw Crusher**

Texrope Drives for Crushers

Rugged enough for the hardest crushed drives, flexible and shock absorbing, protecting the motor from shocks.

Compact, allowing better arrangement of machines, decreasing the cost of construction.

Economical and efficient, reducing power and maintenance costs to a new minimum.

Write for Further Details

Allis-Chalmers Manufacturing Company
Milwaukee, Wisconsin, U. S. A.

ALLIS-CHALMERS TEXROPE DRIVE

Harbor and Seattle, Wash., has opened an office at 681 Market St., San Francisco, Calif.

Roaring Spring Marl Lime Co., Inc., Glouster, Va., is said to be contemplating some new installations, including a 100-hp. boiler, dump cars, track, etc.

Calera, Ala. It is reported that Frederick A. Sawyer, civil and landscaping engineer, visited here recently in the interests of Pittsburgh capitalists for the probable acquisition of large land holdings at and around Calera in Shelby County to build an industrial town in connection with the development of lime fields.

Gypsum

Pacific Portland Cement Co. has started work on the rebuilding of its gypsum mill at Plaster City, Calif., which was destroyed by fire last summer (reported in ROCK PRODUCTS, September 3, 1927). Fifty men, under the direction of Supt. C. G. Townsend, has started work on the new plant, which will have a daily capacity of 300 tons, 75 tons greater than that of the old plant. The new building is to be built of steel and concrete and is scheduled to be ready for operation by January 15.

Gulf Gypsum Co., producers of lime rock and gypsum, are negotiating with City Commissioner Adrian E. Langford of Pensacola, Fla., for a lease of the municipal pier, according to newspaper reports. The company proposes to establish distributing headquarters at Pensacola, with a large warehouse occupying the entire end of the municipal pier, and a terminal for a barge and towboat line. It is reported that if the plan materializes more than 10,000 tons of material would be shipped by barge line into Pensacola monthly to be stored until sent out by rail.

Miscellaneous Rock Products

Bennett-Christiansen Co., South Bend, Ind., according to reports, has leased the Copeland farm at Brenham, Tex., and will develop fuller's earth deposits, probably establishing a plant for refining.

Modoc County, Calif. E. L. Jamerson of Redding, Calif., and John Miller of Alturas, Calif., have staked out a mining claim 32 miles east of Tennant in Modoc County, consisting of about two square miles of pumice stone. The deposit is reported to be 3 ft. thick. Shipments will be made over the Long-Bell railroad.

Crockett County, Tex. Contract for drilling potash well No. 5 on the Harris Brothers' ranch, Crockett County, Tex., has been awarded to the Pennsylvania Drilling Co., Pittsburgh, Penn., by the U. S. Bureau of Mines, in the Federal Government's program to develop domestic potash supplies. The well will be sunk to a total depth of about 2000 ft. Drilling will be done with cable tools to the top of the potash-bearing salts, a depth of approximately 1190 ft. After the salts are encountered, the diamond drill will be employed. The cores obtained as a result of drilling operations are turned over to the United States Geological Survey for study and analysis.

Personals

Harrison Souder has resigned as general manager of the Bethlehem Mines Corp., Cornwall division, Lebanon County, Penn. He is at present located at Ridgewood, N. J.

George T. Birch has been transferred from the home office of the R. H. Beaumont Co., Philadelphia, Penn., to their Detroit office, 901 Kresge Bldg., and will act as district manager of that territory.

H. N. Spicer of the Dorr Co., New York, accompanied by Mrs. Spicer, has left for Australia, China and Japan, to be gone for several months in connection with his company's interests in those countries.

Chester S. Ricker, consulting engineer, has joined the Cramer-Krassett Co., advertising agency of Milwaukee, Wis., where he will handle the Waukesha Motors account. Mr. Ricker has been advertising manager of the Waukesha Motors Co. and consulting engineer for a number of automotive companies.

Edgar McNall has been appointed advertising manager of the Speeder Machinery Corp., Cedar Rapids, Iowa, manufacturers of shovels, pull shovels, skimmers, cranes, draglines and backfillers. Mr. McNall has had considerable experience in advertising previous to this connection, having been for eight years associated with the advertising departments of Cedar Rapids newspapers.

Edwin H. Lundgren, for the past four years general sales manager of the Combustion Engineering Corp., New York City, N. Y., has recently been elected vice-president and general sales manager of the company. Mr. Lundgren became associated with the Combustion Engineering Corp. in 1921, previous to that time being connected with the Frederick Engineering Co., Frederick, Md., as vice-president and chief engineer.

E. H. Lundgren

Harry L. Horning, president of the Waukesha Motor Co., Waukesha, Wis., and president of the Motor and Accessory Manufacturers Association, is making an extended European trip, accompanied by Mrs. Horning. He will visit England, France, Germany and Italy, studying both business conditions and new technical developments of interest to the automotive industry. James B. Fisher, chief engineer of the Waukesha Motor Co., is also making an European trip at this time.

Obituaries

W. B. Stegman, superintendent of the Trinity Portland Cement Co., Houston, Tex., died recently from a heart attack brought on by the excitement attending the death of Homer Fenton, barge skipper for the company, who was killed when he fell from a barge into the ship channel and on coming to the surface grasped an electric wire of high voltage.

Manufacturers

Kritzer Co., Chicago, Ill., are now located in their new factory at 515 W. 35th St., Chicago.

Robertson & Co., Inc., Cleveland, Ohio, designing and constructing engineers, have moved their offices from the Century Bldg. to the Hanna Bldg., Cleveland, Ohio.

Morse Chain Co., Ithaca, N. Y., announce the appointment of Harry E. Matthews as manager of their Charlotte, N. C., office to succeed George W. Pritchett, who died on September 15.

Lincoln Electric Co., Cleveland, Ohio, announce the transfer of R. P. Nick from the Baltimore, Md., office to the Lancaster, Penn., office, where he will be in charge of the sale of "Linc-Weld" motors and "Stable-Arc" welders.

Falk Corp., Milwaukee, Wis., announce that arrangements have been made with William Kennedy & Sons, Ltd., Owen Sound, Ont., whereby this company is to manufacture and sell Falk continuous tooth herringbone gears, herringbone speed reducers and flexible couplings in Canada.

McGann Manufacturing Co., Inc., York, Penn., has made contracts to build Schulthess hydrate plants for the Salem Lime & Stone Co., Salem, Ind., Jamieson Lime Co., Renfrew, Ontario, Can., and the Bakerton, W. Va., operations of the Washington Building Lime Co. of Baltimore Md.

Racine Radiator Co., which recently moved its plant from Racine to Milwaukee, Wis., has changed its name to the Perfex Corp. The change in name is due to the change in location, and the word Perfex has been incorporated because it is the registered trademark of the company. The entire organization and management remain substantially the same as that which operated under the previous name.

Erie City Iron Works, Erie, Penn., announce the following appointments: J. R. Edwards, formerly western sales manager for the Pittsburgh Steel Products Co., as manager of sales; C. A. Reed, formerly with the Combustion Engineering Corp., as Pittsburgh district manager with offices at 1230 Park Bldg., Pittsburgh, Penn.; Joel Eklund, formerly process engineer of the United States Gypsum Co., as sales engineer; J. R. Le Vally, formerly director of engineering of the Motor Fuel Corp., as special representative, and C. O. Hoban, formerly with the Riley Stoker Corp., as special representative.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., announce the consolidation of several merchandising territories and the appointment of the following executives to be in direct charge of operations in these sections: M. C. Morrow, sales manager, and F. R. Kohnstamm, assistant sales manager, of the merchandising department; George T. Kunklin, district merchandising distribution manager with headquarters in New York, of the territory comprising the northeastern sales section and the Philadelphia district, which has been consolidated with respect to merchandising, and will be known as the Northeastern merchandising district; George Bailey, district merchandising distribution manager, at San Francisco, of the territory comprising the present San Francisco, Los Angeles and Seattle districts, which have been consolidated with respect to merchandising and will be known as the Pacific Coast merchandising district; P. Y. Danley, district merchandising distribution manager, with headquarters at Mansfield, Ohio, of the territory comprising the present Pittsburgh, Cincinnati and Detroit districts, which have also been consolidated with respect to merchandising and will be known as the North Central merchandising district; J. Paul Teller is appointed manager of the Interior Lighting Section and will continue to be located at South Bend, Ind.

Institute of Makers of Explosives, 103 Park Ave., New York City. With the idea of reducing the number of accidents to children from playing with blasting caps, this organization has just prepared a one-reel motion picture film entitled: "How Jimmy Won the Game." The film shows forcefully and in a way which can be understood by the children the dangers of a blasting cap as a plaything. It is proposed to offer this film to schools and safety meetings. Copies of it can be had by addressing C. Stewart Comeaux, secretary of the Institute, at the above address.

Trade Literature

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Hardinge Grinding Mills and R-C Dryers. Illustrated bulletin. HARDINGE CO., York, Penn. Penn.

Buckets. 32-page illustrated booklet on buckets of all types and sizes, ranging from 2 cu. ft. to 11 cu. yd. capacity. G. H. WILLIAMS CO., Erie, Penn.

Locomotives. New illustrated folder on "Davenport" gas-electric industrial locomotives. DAVENPORT LOCOMOTIVE WORKS, Davenport, Iowa.

Hoists. Bulletin No. 21, describing and illustrating the "Ideal" spur-geared ball bearing chain hoist. DICKERMAN HOIST MFG. CO., Cleveland, Ohio.

Refractories. Attractive booklet describing the service of "Arcofrax" high alumina brick in the three kilns of a cement plant. GENERAL REFRACTORIES CO., Philadelphia, Penn.

Lime Plant Equipment. New catalog describing the "Arnold" vertical lime kiln, "Weber" batch type lime hydrator, and "Ward" automatic coal feeder. ARNOLD & WEIGEL, Woodville, Ohio.

Building Units. Bulletin outlining in detail the Crozier system method and machinery for making brick, blocks or hollow tile of wet mix concrete. ALFRED OWEN CROZIER, New York City, N. Y.

Hoists and Car Pullers. Two illustrated bulletins—No. 105, describing in detail Fridy hoists, and Bulletin No. 110 on Fridy car pullers. FRIDY HOIST AND MACHINERY CO., Mountville, Penn.

Shovel, Crane, Dragline and Back Digger. Illustrated bulletin on the Lorain 75. 1¼-yd. shovel, crane, dragline and back digger. Details of design, construction and operation data, etc. THEW SHOVEL CO., Lorain, Ohio.

Power Demand Limitator. Bulletin No. 11 on the "Edmoor" electrical device for automatically controlling and limiting power demands on peak loads on electric power systems. EDWARD T. MOORE CO., Syracuse, N. Y.

Diamond Core Drills. Bulletin No. 80-D on the "Baby Turbinair" diamond drill for underground prospecting, and Bulletin No. 80-E on the "Bravo-300" diamond core drill for hand, gasoline engine or motor drive. SULLIVAN MACHINERY CO., Chicago, Ill.

Turbine Generator Units. Leaflet No. 2000-D on direct connected turbine generator units—capacities 5, 7½, 10 and 15 Kw. for 125 and 250 volts direct current operation. WESTINGHOUSE ELECTRIC AND MANUFACTURING CO., East Pittsburgh, Penn.

Unit Heating System. The Venturafin method of unit heating as applied by the Austin Co., architects, engineers and builders, in the new Pontiac plant of the Oakland Motor Car Co. Specifications, construction, installation and application data. AMERICAN BLOWER CO., Detroit, Mich.

Control Apparatus. Broadside on control apparatus "tailored" to the motor and the job. Pamphlet covers control apparatus for squirrel cage motors, wound rotor motors, direct current motors, synchronous motors, etc. WESTINGHOUSE ELECTRIC AND MFG. CO., East Pittsburgh, Penn.